Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

Structures

The following structures are used with SAPI 5.

- SPAUDIOBUFFERINFO
- SPAUDIOSTATUS
- SPBINARYGRAMMAR
- SPEVENT
- SPEVENTSOURCEINFO
- SPPARSEINFO
- SPPATHENTRY
- SPPHRASE
- SPPHRASEALT
- SPPHRASEALTREQUEST
- SPPHRASEELEMENT
- SPPHRASEPROPERTY
- SPPHRASEREPLACEMENT
- SPPHRASERULE
- SPPROPERTYINFO
- SPRECOCONTEXTSTATUS
- SPRECOGNIZERSTATUS
- SPRECORESULTINFO
- SPRECORESULTTIMES
- SPRULEENTRY
- SPSERIALIZEDEVENT
- SPSERIALIZEDPHRASE
- SPSERIALIZEDRESULT
- SPSTATEINFO
- SPTEXTSELECTIONINFO
- SPTMTHREADINFO
- SPTRANSITIONENTRY
- SPTRANSITIONPROPERTY
- SPVCONTEXT
- SPVOICESTATUS
- SPVPITCH
- SPVSENTITEM
- SPVSTATE
- SPVTEXTFRAG
- SPWORD
- SPWORDENTRY
- SPWORDLIST
- SPWORDPRONUNCIATION
- SPWORDPRONUNCIATIONLIST
- WAVEFORMATEX

[This is preliminary documentation and subject to change.]

SPAUDIOBUFFERINFO

SPAUDIOBUFFERINFO contains the audio stream buffer information.

```
typedef struct SPAUDIOBUFFERINFO
{
    ULONG         ulMsMinNotification;
    ULONG         ulMsBufferSize;
    ULONG         ulMsEventBias;
} SPAUDIOBUFFERINFO;
```

Members

ulMsMinNotification
The minimum desired time, in milliseconds, allowed between the actual time an event notification occurs and the ideal time. The smaller this number is, the more CPU overhead is required, but the event notifications will be more timely. This value must be at most one quarter the size of the *ulMsBuffersize*.

ulMsBufferSize
The size of the audio object's buffer, in milliseconds. For readable audio objects, this is simply a desired size – readable objects will automatically expand their buffers to accommodate data. For writeable audio objects, this is the amount of audio data that will be buffered before a call to Write will block.

ulMsEventBias
The amount of time, in milliseconds, that events will be completed before they actually occur. For example, setting a value of 100 for the event bias would cause all events to be notified 100 milliseconds prior to the audio data being played. This can be useful for applications needing time to animate mouths for synthetic speech.

[This is preliminary documentation and subject to change.]

SPAUDIOSTATUS

```
typedef [restricted] struct SPAUDIOSTATUS
{
    long            cbFreeBuffSpace;
    ULONG           cbNonBlockingIO;
    SPAUDIOSTATE    State;
    ULONGLONG       CurSeekPos;
    ULONGLONG       CurDevicePos;
    DWORD           dwReserved1;
    DWORD           dwReserved2;
} SPAUDIOSTATUS;
```

Members

cbFreeBuffSpace
Size, in bytes, of free space for reading and/or writing in the audio object.

cbNonBlockingIO

State
The state of type SPAUDIOSTATE of the audio device.

CurSeekPos
The current seek position, in bytes, within the audio stream. This is the position in the stream at which the next read or write will be performed.

CurDevicePos
The current read position, in bytes, of the device. This is the position in the stream where the device is currently reading or writing. For readable streams, this value will always be greater than or equal to CurSeekPos. For writeable streams, this value will always be less than or equal to CurSeekPos.

dwReserved1
Reserved for future expansion.

dwReserved2
Reserved for future expansion.

[This is preliminary documentation and subject to change.]

SPBINARYGRAMMAR

SPBINARYGRAMMAR contains the grammar size information.

```
typedef struct SPBINARYGRAMMAR
{
    ULONG     ulTotalSerializedSize;
} SPBINARYGRAMMAR;
```

Members

ulTotalSerializedSize
Total size, in bytes, of the serialized grammar.

[This is preliminary documentation and subject to change.]

SPEVENT

SPEVENT passes back information about event objects.

```
typedef struct SPEVENT
{
    int           eEventId : 16;
    int           elParamType : 16;
    ULONG         ulStreamNum;
    ULONGLONG     ullAudioStreamOffset;
    WPARAM        wParam;
    LPARAM        lParam;
} SPEVENT;
```

Members

eEventId : 16
The event ID of type SPEVENTENUM.
elParamType : 16;
The parameter type of type SPEVENTLPARAMTYPE.
eEventId
The event ID. This ID contains flags used to define the characteristic of the event. Three characteristics are defined. Event Flags identify each event as separate depending on the context or the event source. Private Driver Code stores driver-dependent relationships. The pointer flag to *lParam* indicates that the *LParam* field of SPEVENT points to valid information. In this case, the *wParam* field stores the size of the structure.
ulStreamNum
The input stream number of the ISpVoice::Speak or ISpVoice::SpeakStream method associated with the event.
ullAudioStreamOffset
An offset with the audio stream for the event. For synthesis, the output is the synthesized data. For recognition, this indicates the required audio stream.
wParam
The generic word field. For event IDs with the SPFEI_LPARAM_IS_POINTER set, this is the size, in bytes, for the data pointed to by *lParam*. In some cases, the type of event will change the function of this parameter. See SPEVENTENUM for information about specific events.
lParam
The generic event field. For event IDs with the SPFEI_LPARAM_IS_POINTER set, this points to the data allocated by CoTaskMemAlloc. The caller is responsible for freeing this memory using CoTaskMemFree(). In some cases, the type of event will change the function of this parameter. See SPEVENTENUM for information about specific events.

SPEVENTSOURCEINFO

A structure used by ISpEventSource::GetInfo to pass back event information.

```
typedef struct SPEVENTSOURCEINFO
{
   ULONGLONG   ullEventInterest;
   ULONGLONG   ullQueuedInterest;
   ULONG       ulCount;
} SPEVENTSOURCEINFO;
```

Members

ullEventInterest
Event ID flags of type SPEVENTENUM marking events which invoke a notification.
ullQueuedInterest
Queue of event IDs. These remain until ISpEventSource::GetEvents removes them.
ulCount
Number of events currently queued.

[This is preliminary documentation and subject to change.]

SPPARSEINFO

```
typedef struct SPPARSEINFO
{
   ULONG          cbSize;
   SPRULEHANDLE   hRule;
   ULONGLONG      ullAudioStreamPosition;
   ULONG          ulAudioSize;
   ULONG          cTransitions;
   SPPATHENTRY   *pPath;
   BOOL           fHypothesis;
   GUID           SREngineID;
   ULONG          ulSREngineP rivateDataSize;
   const BYTE    *pSREnginePrivateData;
} SPPARSEINFO;
```

Members

cbSize
hRule
ullAudioStreamPosition
ulAudioSize
cTransitions
pPath
fHypothesis
SREngineID
ulSREnginePrivateDataSize
pSREnginePrivateData

[This is preliminary documentation and subject to change.]

SPPATHENTRY

```
typedef [restricted] struct SPPATHENTRY
{
    union
    {
        SPTRANSITIONID      hTransition;
        SPPHRASEELEMENT     elem;
    };
} SPPATHENTRY;
```

Members

hTransition
elem

[This is preliminary documentation and subject to change.]

SPPHRASE

```
typedef [restricted] struct SPPHRASE
{
    ULONG                             cbSize;
    LANGID                            LangID;
    WORD                              wReserved;
    ULONGLONG                         ftStartTime;
    ULONGLONG                         ullAudioStreamPosition;
    ULONG                             ulAudioSizeBytes;
    ULONG                             ulAudioSizeTime;
    SPPHRASERULE                      Rule;
    const SPPHRASEPROPERTY          * pProperties;
    const SPPHRASEELEMENT           * pElements;
    ULONG                             cReplacements;
    const SPPHRASEREPLACEMENT       * pReplacements;
    GUID                              SREngineID;
    ULONG                             ulSREnginePrivateDataSize;
    const BYTE                      * pSREnginePrivateData;
} SPPHRASE;
```

Members

cbSize
The size of this structure in bytes.
LangID
The language ID of the current language.
wReserved
Reserved for future use.
ftStartTime
ullAudioStreamPosition
ulAudioSizeBytes
ulAudioSizeTime
Rule
pProperties
pElements
cReplacements
pReplacements
SREngineID
ulSREnginePrivateDataSize
pSREnginePrivateData

[This is preliminary documentation and subject to change.]

SPPHRASEALT

```
typedef struct tagSPPHRASEALT
{
    ISpPhraseBuilder    *pPhrase;
    ULONG                ulStartElementInParent;
    ULONG                cElementsInParent;
```

```
   ULONG              cElementsInAlternate;
   void              *pvAltExtra;
   ULONG              cbAltExtra;
} SPPHRASEALT;
```

Members

pPhrase
ulStartElementInParent
cElementsInParent
cElementsInAlternate
pvAltExtra
cbAltExtra

[This is preliminary documentation and subject to change.]

SPPHRASEALTREQUEST

```
typedef struct tagSPPHRASEALTREQUEST
{
    ULONG            ulStartElement;
    ULONG            cElements;
    ULONG            ulRequestAltCount;
    void *           pvResultExtra;
    ULONG            cbResultExtra;
    ISpPhrase *      pPhrase;
    ISpRecoContext * pRecoContext;
} SPPHRASEALTREQUEST;
```

Members

ulStartElement
cElements
ulRequestAltCount
pvResultExtra
cbResultExtra
pPhrase
pRecoContext

[This is preliminary documentation and subject to change.]

SPPHRASEELEMENT

```
typedef [restricted] struct SPPHRASEELEMENT
{
    ULONG                   ulAudioStreamOffset;
    ULONG                   ulAudioTimeOffset;
    ULONG                   ulAudioSizeBytes;
    ULONG                   ulAudioSizeTime;     // In 100ns units
    const WCHAR *           pszDisplayText;
    const WCHAR *           pszLexicalForm;
    const WCHAR *           pszPronunciation;
    BYTE                    bDisplayAttributes;
    char                    RequiredConfidence;
    char                    ActualConfidence;
    float                   SREngineConfidence;
    BYTE                    Reserved;
} SPPHRASEELEMENT;
```

Members

ulAudioStreamOffset
ulAudioTimeOffset
ulAudioSizeBytes
ulAudioSizeTime
pszDisplayText
pszLexicalForm
pszPronunciation
bDisplayAttributes
RequiredConfidence
ActualConfidence
SREngineConfidence
Reserved

[This is preliminary documentation and subject to change.]

SPPHRASEPROPERTY

```
struct SPPHRASEPROPERTY
{
    const WCHAR *           pszName;
    ULONG                   ulId;
    const WCHAR *           pszValue;
    VARIANT                 vValue;
    ULONG                   ulFirstElement;
    ULONG                   ulCountOfElements;
    char                    PropertyConfidence;
    const SPPHRASEPROPERTY* pNextSibling;
    const SPPHRASEPROPERTY* pFirstChild;
};
```

Members

pszName
ulId
pszValue
vValue
Will be VT_BOOL, VT_I4, VT_R4, VT_R8, or VT_BYREF (only for dynamic grammars)
ulFirstElement
ulCountOfElements
PropertyConfidence
pNextSibling
pFirstChild

[This is preliminary documentation and subject to change.]

SPPHRASEREPLACEMENT

```
typedef struct tagSPPHRASEREPLACEMENT
{
    BYTE                    bDisplayAttributes;
    const WCHAR *           pszReplacementText;
    ULONG                   ulFirstElement;
    ULONG                   ulCountOfElements;
} SPPHRASEREPLACEMENT;
```

Members

bDisplayAttributes
pszReplacementText
ulFirstElement
ulCountOfElements

[This is preliminary documentation and subject to change.]

SPPHRASERULE

```
struct tagSPPHRASERULE
{
    const WCHAR *           pszName;
    ULONG                   ulId;
    ULONG                   ulFirstElement;
    ULONG                   ulCountOfElements;
    const SPPHRASERULE *    pNextSibling;
    const SPPHRASERULE *    pFirstChild;
};
```

Members

pszName
ulId
ulFirstElement
ulCountOfElements
pNextSibling
pFirstChild

[This is preliminary documentation and subject to change.]

SPPROPERTYINFO

SPPROPERTYINFO contains property name and value information.

```
typedef struct tagSPPROPERTYINFO
{
    const WCHAR    *pszName;
    ULONG           ulId;
    const WCHAR    *pszValue;
    VARIANT         vValue;
} SPPROPERTYINFO;
```

Members

pszName
Pointer to the null-terminated string that contains the name information of the property.

ulId
Identifier associated with the property.

pszValue
Pointer to the null-terminated string that contains the value information of the property.

vValue
Must be one of the following: VT_BOOL, VT_I4, VT_R4, VT_R8, or VT_BYREF (for dynamic grammars only.)

[This is preliminary documentation and subject to change.]

SPRECOCONTEXTSTATUS

```
typedef [restricted] struct SPRECOCONTEXTSTATUS
{
    SPINTERFERENCE   eInterference;
    WCHAR            szRequestTypeOfUI[255];
    DWORD            dwReserved1;
    DWORD            dwReserved2;
} SPRECOCONTEXTSTATUS;
```

Members

eInterference
One of the interference types contained in the SPINTERFERENCE enumeration.

szRequestTypeOfUI[255]
Specifies the type of UI requested. If the first byte is NULL, then no UI is requested.

dwReserved1
Reserved for future expansion.

dwReserved2
Reserved for future expansion.

[This is preliminary documentation and subject to change.]

SPRECOGNIZERSTATUS

```
typedef [restricted] struct SPRECOGNIZERSTATUS
{
    SPAUDIOSTATUS    AudioStatus;
    ULONGLONG        ullRecognitionStreamPos;
    ULONG            ulStreamNumber;
    ULONG            ulNumActive;
    CLSID            clsidEngine;
    ULONG            cLangIDs;
    LANGID           aLangID[ SP_MAX_LANGIDS ];
    DWORD            dwReserved1;
    DWORD            dwReserved2;
} SPRECOGNIZERSTATUS;
```

Members

AudioStatus
The SPAUDIOSTATUS structure containing the current audio device information.
ullRecognitionStreamPos
ulStreamNumber
ulNumActive
The current engine's number of active languages.
clsidEngine
The unique identifier associated with the current engine.
cLangIDs
The current engine's number of valid language identifiers.
aLangID
The engine can support a maximum of SP_MAX_LANGIDS active languages.
dwReserved1
Reserved for future expansion.
dwReserved2
Reserved for future expansion.

[This is preliminary documentation and subject to change.]

SPRECORESULTINFO

SPRECORESULTINFO is the result structure passed from the engine to SAPI.

```
typedef struct SPRECORESULTINFO
{
    ULONG              cbSize;
    SPRESULTTYPE       eResultType;
    BOOL               fHypothesis;
    BOOL               fProprietaryAutoPause;
    ULONGLONG          ullStreamPosStart;
    ULONGLONG          ullStreamPosEnd;
    SPGRAMMARHANDLE    hGrammar;
    ULONG              ulSizeEngineData;
    void              * pvEngineData;
    ISpPhraseBuilder  *pPhrase;
} SPRECORESULTINFO;
```

Members

cbSize
Total size, in bytes, of this structure.
eResultType
Type of result object (CFG, SLM, or Proprietary).
fHypothesis
If TRUE then this recognition is a hypothesis.
fProprietaryAutoPause
This field is only used for SPERT_PROPRITARY grammars. If TRUE, the recognition will pause.
ullStreamPosStart
Starting position within the input stream.
ullStreamPosEnd
Ending position within the input stream.
hGrammar
Required for SPERT_SLM and SPERT_PROPRIETARY, otherwise this value is NULL
ulSizeEngineData
Specifies the size of *pvEngineData.*
pvEngineData
Pointer to the engine data.
pPhrase
Pointer to phrase object

[This is preliminary documentation and subject to change.]

SPRECORESULTTIMES

SPRECORESULTTIMES contains the time information for speech recognition. This data structure is used by the **ISpRecoResult::GetResultTimes** method.

```
typedef struct SPRECORESULTTIMES
{
    FILETIME     ftStreamTime
    ULONGLONG    ullLength
    DWORD        dwTickCount;
    ULONGLONG    ullStart;
} SPRECORESULTTIMES;
```

Members

ftStreamTime
Number of 100 nanosecond units in UTC time from January 1, 1601 to the start of the current result. This is the same as calling the Win32 GetSystemTimeAsFileTime() function for the result.
ullLength
Value containing the length of the phrase specified in 100 nanosecond units.
dwTickCount

Number of 100 nanosecond units elasped from the start of the system to the start of the current result.

ulStart

Value containing the total 100 nanosecond units from the start of the stream to the start of the phrase.

[This is preliminary documentation and subject to change.]

SPRULEENTRY

```
typedef [restricted] struct SPRULEENTRY
{
    SPRULEHANDLE    hRule;
    SPSTATEHANDLE   hInitialState;
    DWORD           Attributes;
    void *          pvClientContext;
} SPRULEENTRY;
```

Members

hRule
hInitialState
Attributes
pvClientContext

[This is preliminary documentation and subject to change.]

SPSERIALIZEDEVENT

```
typedef [restricted] struct SPSERIALIZEDEVENT
{
    WORD        eEventId;
    WORD        elParamType;
    ULONG       ulStreamNum;
    ULONGLONG   ullAudioStreamOffset;
    ULONG       SerializedwParam;
    LONG        SerializedlParam;
} SPSERIALIZEDEVENT;
```

Members

eEventId

One of the event identifiers from the SPEVENTENUM enumeration.

elParamType

One of the event parameter types from the SPEVENTLPARAMTYPE enumeration.

ulStreamNum

The input stream number associated with this event.

ullAudioStreamOffset
SerializedwParam

SerializedlParam

[This is preliminary documentation and subject to change.]

SPSERIALIZEDPHRASE

```
typedef struct tagSPSERIALIZEDPHRASE
{
   ULONG      ulSerializedSize;
} SPSERIALIZEDPHRASE;
```

Members

ulSerializedSize
Value specifying the size of the structure in bytes.

[This is preliminary documentation and subject to change.]

SPSERIALIZEDRESULT

SPSERIALIZEDRESULT contains the phrase size information.

```
typedef struct SPSERIALIZEDRESULT
{
   ULONG    ulSerializedSize;
} SPSERIALIZEDRESULT;
```

Members

ulSerializedSize
The size of the entire phrase in bytes, including this ULONG.

[This is preliminary documentation and subject to change.]

SPSTATEINFO

```
typedef [restricted] struct SPSTATEINFO
{
    ULONG                 cAllocatedEntries;
    SPTRANSITIONENTRY * pTransitions;
    ULONG                 cEpsilons;
    ULONG                 cRules;
    ULONG                 cWords;
    ULONG               cTextBuffer;
} SPSTATEINFO;
```

Members

cAllocatedEntries
pTransitions
Pointer to a SPTRANSITIONENTRY structure.
cEpsilons
cRules
cWords
cTextBuffer

[This is preliminary documentation and subject to change.]

SPTEXTSELECTIONINFO

```
typedef struct tagSPTEXTSELECTIONINFO
{
    ULONG       ulStartActiveOffset;
    ULONG       cchActiveChars;
    ULONG       ulStartSelection;
    ULONG       cchSelection;
} SPTEXTSELECTIONINFO;
```

Members

ulStartActiveOffset
cchActiveChars
ulStartSelection
cchSelection

[This is preliminary documentation and subject to change.]

SPTMTHREADINFO

SPTMTHREADINFO contains thread management information implemented by the ISpTaskManager interface.

```
typedef struct SPTMTHREADINFO
{
    long    lPoolSize;
    long    lPriority;
    ULONG   ulConcurrencyLimit;
    ULONG   ulMaxQuickAllocThreads;
} SPTMTHREADINFO;
```

Members

lPoolSize
  Number of threads in pool (-1 default)
lPriority
  Priority of threads in pool
ulConcurrencyLimit
  Number of threads allowed to concurrently execute (0 default)
ulMaxQuickAllocThreads
  Maximum number of dedicated threads retained

[This is preliminary documentation and subject to change.]

SPTRANSITIONENTRY

```
typedef [restricted] struct SPTRANSITIONENTRY
{
    SPTRANSITIONID      ID;
    SPSTATEHANDLE       hNextState;
    BYTE                Type;       // SPTRANSITIONTYPE
    char                RequiredConfidence;
    struct
    {
        DWORD fHasProperty;
                //BUGBUG: should be bitfield -- robch
    };
    float               Weight;
    union
    {
        struct
        {
            SPSTATEHANDLE   hRuleInitialState;  // Only if Type == SPTRANSRULE
            SPRULEHANDLE    hRule;
            void          * pvClientRuleContext;
        };
        struct
        {
            SPWORDHANDLE    hWord;              // Only if Type == SPTRANSWORD
            void          * pvClientWordContext;
        };
        struct
        {
            void          * pvGrammarCookie;    // Only if Type == SPTRANSTEXTBUF
        };
    };
} SPTRANSITIONENTRY;
```

Members

ID
hNextState
Type
RequiredConfidence
Reserved
Weight
hRuleInitialState
hRule

pvClientRuleContext
hWord
pvClientWordContext
pvGrammarCookie

[This is preliminary documentation and subject to change.]

SPTRANSITIONPROPERTY

SPTRANSITIONPROPERTY contains transition property information.

```
typedef [restricted] struct  SPTRANSITIONPROPERTY
{
    const WCHAR    *pszName;
    ULONG           ulId;
    const WCHAR    *pszValue;
    VARIANT         vValue;
} SPTRANSITIONPROPERTY;
```

Members

pszName
Address of a null-terminated string containing the name information.
ulId
Identifier associated with the transition property.
pszValue
Address of a null-terminated string containing the value information.
vValue
For dynamic grammars this value will be VT_BOOL, VT_I4, VT_R4, VT_R8, or VT_BYREF.

[This is preliminary documentation and subject to change.]

SPVCONTEXT

SPVCONTEXT contains information specifying audio string context category information.

```
typedef [restricted] struct SPVCONTEXT
{
    LPCWSTR   pCategory;
    LPCWSTR   pBefore;
    LPCWSTR   pAfter;
} SPVCONTEXT;
```

Members

pCategory
Specifies the name information associated with the context category.

pBefore
Specifies the *pBefore* pointer associated with the audio string.
pAfter
Specifies the *pAfter* pointer associated with the audio string.

[This is preliminary documentation and subject to change.]

SPVOICESTATUS

SPVOICESTATUS contains voice stream information.

```
typedef struct SPVOICESTATUS
{
    ULONG       ulCurrentStream;
    ULONG       ulLastStreamQueued;
    HRESULT     hrLastResult;
    DWORD       dwRunningState;
    ULONG       ulInputWordPos;
    ULONG       ulInputWordLen;
    ULONG       ulInputSentPos;
    ULONG       ulInputSentLen;
    LONG        lBookmarkId;
    SPPHONEID   PhonemeId;
    SPVISEMES   VisemeId;
    DWORD       dwReserved1;
    DWORD       dwReserved2;
} SPVOICESTATUS;
```

Members

ulCurrentStream
Number of the current stream being synthesized or receiving output.
ulLastStreamQueued
Number of the last stream queued.
hrLastResult
Result of the last speak.
dwRunningState
Set if and only if all streams generated by Speak and SpeakStream calls have been sent to the audio output.
ulInputWordPos
Character position within the stream of the word currently being rendered.
ulInputWordLen
Length of the word currently being rendered.
ulInputSentPos
Character position within the stream of the word currently being sent.
ulInputSentLen
Length of the word currently being sent.
lBookmarkId
Current bookmark name (in base 10) converted to a long integer. If name of current bookmark not an integer then *lBookmarkId* will be zero.
PhonemeId
Current phoneme ID.
VisemeId
Current viseme ID.

dwReserved1
Reserved for future expansion.
dwReserved2
Reserved for future expansion.

[This is preliminary documentation and subject to change.]

SPVPITCH

```
typedef struct SPVPITCH
{
    long MiddleAdj;
    long RangeAdj;
} SPVPITCH;
```

Members

MiddleAdj
RangeAdj

Remarks

See Also

[This is preliminary documentation and subject to change.]

SPVSENTITEM

```
typedef struct SPVSENTITEM
{
    const SPVSTATE* pXmlState;
    LPCWSTR         pItem;
    ULONG           ulItemLen;
    ULONG           ulItemSrcOffset;  // Original source character position
    ULONG           ulItemSrcLen;     // Length of original source item in charact
} SPVSENTITEM;
```

Members

pXmlState
pItem
ulItemLen
ulItemSrcOffset
ulItemSrcLen

[This is preliminary documentation and subject to change.]

SPVSTATE

```
typedef [restricted] struct SPVSTATE
{
  //--- Action
    SPVACTIONS       eAction;

  //--- Running state values
    LANGID           LangID;
    WORD             wReserved;
    long             EmphAdj;
    long             RateAdj;
    ULONG            Volume;
    SPVPITCH         PitchAdj;
    ULONG            SilenceMSecs;
    SPPHONEID*       pPhoneIds;
    SPPARTOFSPEECH   ePartOfSpeech;
    SPVCONTEXT       Context;
} SPVSTATE;
```

Members

eAction
: Describes the action to be performed with the associated text fragment. The normal action is to Speak (SPVA_Speak) the fragment.

LangID
: The language ID of the current language.

wReserved
: Reserved for future use.

EmphAdj
: Determines if the text should be emphasized. Zero means no emphasis is used and one indicates emphasis is used.

RateAdj
: The current rate for the voice instance. Zero uses the natural rate for the current voice. Other values range from -10 to +10.

Volume
: The current volume level for the voice instance. Valid range is from zero (complete silence) through 100 (full natural volume of the current voice).

PitchAdj
: The current pitch for the voice instance. Zero uses the natural pitch for the current voice. Other values range from -10 to +10.

SilenceMSecs
: The length of a silence, in milliseconds, to be inserted.

pPhoneIds
: Pointer to a null-terminated array of Phone identifiers.

ePartOfSpeech
: SAPI standard part of speech.

Context
: The context for the text being synthesized. This is intended for use during the normalization phase. A category preceding and following text can be specified.

[This is preliminary documentation and subject to change.]

SPVTEXTFRAG

The SPVTEXTFRAG structure contains information about the voice's text fragment during speech synthesis.

```
typedef struct SPVTEXTFRAG
{
    struct SPVTEXTFRAG*   pNext;
    SPVSTATE              State;
    LPCWSTR               pTextStart;
    ULONG                 ulTextLen;
    ULONG                 ulTextSrcOffset;
} SPVTEXTFRAG;
```

Members

pNext
    Pointer to the next text fragment in list. A NULL value indicates the end of the list.
State
    The current XML attribute state.
pTextStart
    Pointer to the beginning text string.
ulTextLen
    The length, in characters, of the text string.
ulTextSrcOffset
    Original offset position within the text string.

[This is preliminary documentation and subject to change.]

SPWORD

SPWORD is used with ISpLexicon to temporarily store the word currently being tested. It is usually used in connection with SPWORDLIST.

```
typedef [restricted] struct SPWORD
{
    struct SPWORD          *pNextWord;
    LANGID                  LangID;
    WORD                    wReserved;
    SPWORDTYPE              eWordType;
    WCHAR                  *pszWord;
    SPWORDPRONUNCIATION    *pFirstWordPronunciation;
} SPWORD;
```

Members

pNextWord
    Pointer to the next word in the list.
LangID

The language ID of the word.

wReserved
Reserved for future use.

eWordType
Flag of type SPWORDTYPE indicating whether to add or delete the word.

pszWord
The offset of the word entry.

pFirstWordPronunciation
Pointer to the first possible pronunciation of the word.

[This is preliminary documentation and subject to change.]

SPWORDENTRY

```
typedef [restricted] struct SPWORDENTRY
{
    SPWORDHANDLE    hWord;
    LANGID          LangID;
    const WCHAR   * pszDisplayText;
    const WCHAR   * pszLexicalForm;
    SPPHONEID     * aPhoneId;
    void          * pvClientContext;
} SPWORDENTRY;
```

Members

hWord
Handle to the current word.

LangID
Language identifier.

pszDisplayText
Pointer to a null-terminated string containing the display text information.

pszLexicalForm
Pointer to a null-terminated string containing the lexical text information.

aPhoneId
Pointer to a string containing the phoneme identifier.

pvClientContext
Pointer to a string representing the client context data.

[This is preliminary documentation and subject to change.]

SPWORDLIST

SPWORDLIST is used with ISpLexicon to set and receive words currently in the lexicon. This structure is the beginning of a linked list of SPWORD structures and contains the size and actual buffer of all subsequent word operations.

```
typedef struct SPWORDLIST
```

```
{
   ULONG                      ulSize;
   BYTE                      *pvBuffer;
   SPWORD                    *pFirstWord;
} SPWORDLIST;
```

Members

ulSize
The size of the buffer for the word, in bytes.
pvBuffer
Pointer to the buffer for the word.
pFirstWord
Pointer to the first word in the list.

Examples

The following example is a code fragment demonstrating the use and creation of SPWORDLIST. The code initializes the structure prior to use.

```
SPWORDLIST SPWordList;
   hr = ZeroMemory(&SPWordList, sizeof(SPWordList));
   if (SUCCEEDED(hr))
      hr = pLex->GetWords(eLEXTYPE_USER, &dwGen, &dwCookie, &SPWordList);
   ::CoTaskMemFree(SPWordList.pvBuffer);
```

[This is preliminary documentation and subject to change.]

SPWORDPRONUNCIATION

SPWORDPRONUNCIATION is used by ISpLexicon for words with possible variations in pronunciation. SPWORDPRONUNCIATION contains the word pronouncation currently being tried.

```
typedef [restricted] struct SPWORDPRONUNCIATION
{
    struct SPWORDPRONUNCIATION   *pNextWordPronunciation;
    SPLEXICONTYPE                 eLexiconType;
    LANGID                        LangID;
    WORD                          wReserved;
    SPPARTOFSPEECH                ePartOfSpeech;
    WCHAR                         szPronunciation[1];
} SPWORDPRONUNCIATION;
```

Members

pNextWordPronunciation
Pointer to the next possible pronouncation. May be NULL.
eLexiconType
Flags of type SPLEXICONTYPE where this pronouncation (PRO)/part of speech (POS) was obtained.
LangID
The language identifier.
wReserved

Reserved for future use.

ePartOfSpeech

The part of speech used by this particular variation.

szPronunciation[1]

The offset from the start of lex file of the sub-lexwordinfoin. Used to convert the part of speech or pronouncation to a WORDINFO array.

[This is preliminary documentation and subject to change.]

SPWORDPRONUNCIATIONLIST

SPWORDPRONUNCIATIONLIST is used with ISpLexicon::GetPronunciation to list possible variations in pronunciation for a given word. It is used to store intermediate values for word pronunciations. This structure is the start of a linked list of SPWORDPRONUNCIATION structures and contains the size and actual buffer of all subsequent pronunciation attempts.

```
typedef struct SPWORDPRONUNCIATIONLIST
{
   ULONG                    ulSize;
   BYTE                    *pvBuffer;
   SPWORDPRONUNCIATION     *pFirstWordPronunciation;
} SPWORDPRONUNCIATIONLIST;
```

Members

ulSize

Size of the pronunciation buffer, in bytes.

pvBuffer

Pointer to a buffer for one pronunciation.

pFirstWordPronunciation

Pointer to a SPWORDPRONUNCIATION structure.

Example

The following example is a code fragment demonstrating the use and creation of SPWORDPRONUNCIATIONLIST.

```
SPWORDPRONUNCIATIONLIST spwordpronlist;
        memset(spwordpronlist, 0, sizeof(spwordpronlist));

        pISpLexicon->GetPronunciation(L"resume", 0, 0, &spwordpronlist);
        for (
             SPWORDPRONUNCIATION pwordpron = pwordpronlist->pFirstWordPron;
             wordpron != NULL;
             wordpron = pwordpron->pNextWordPron
                )
        {
            DoSomethingWith(pwordpron->ePartOfSpeech, pwordpron->pszPronIPA);
        }
        CoTaskMemFree(spwordpronlist.pvBuffer);
```

[This is preliminary documentation and subject to change.]

WAVEFORMATEX

WAVEFORMATEX defines the format of waveform-audio data. Only format information common to all waveform-audio data formats is included in this structure. For formats requiring additional information, this structure is included as the first member in another structure, along with the additional information.

```
typedef [restricted] struct WAVEFORMATEX
{
    WORD    wFormatTag;
    WORD    nChannels;
    DWORD   nSamplesPerSec;
    DWORD   nAvgBytesPerSec;
    WORD    nBlockAlign;
    WORD    wBitsPerSample;
    WORD    cbSize;
} WAVEFORMATEX;
```

Members

wFormatTag
Waveform-audio format type. Format tags are registered with Microsoft Corporation for many compression algorithms. A complete list of format tags is located in the Mmsystem.h header file.

nChannels
Number of channels in the waveform-audio data. Monaural data uses one channel and stereo data uses two channels.

nSamplesPerSec
Sample rate, in samples per second (hertz), that each channel should be played or recorded. If *wFormatTag* is WAVE_FORMAT_PCM, then common values for *nSamplesPerSec* are 8.0 kHz, 11.025 kHz, 22.05 kHz, and 44.1 kHz. For non-PCM formats, this member must be computed according to the manufacturer's specification of the format tag.

nAvgBytesPerSec
Required average data-transfer rate, in bytes per second, for the format tag. If *wFormatTag* is WAVE_FORMAT_PCM, *nAvgBytesPerSec* should be equal to the product of *nSamplesPerSec* and *nBlockAlign*. For non-PCM formats, this member must be computed according to the manufacturer's specification of the format tag.

Playback and record software can estimate buffer sizes by using the *nAvgBytesPerSec* member.

nBlockAlign
Block alignment, in bytes. The block alignment is the minimum atomic unit of data for the *wFormatTag* format type. If *wFormatTag* is WAVE_FORMAT_PCM, *nBlockAlign* should be equal to the product of *nChannels* and *wBitsPerSample* divided by 8 (bits per byte). For non-PCM formats, this member must be computed according to the manufacturer's specification of the format tag.

Playback and record software must process a multiple of *nBlockAlign* bytes of data at a time. Data written and read from a device must always start at the beginning of a block. For example, it is illegal to start playback of PCM data in the middle of a sample (that is, on a non-block-aligned boundary).

wBitsPerSample
Bits per sample for the *wFormatTag* format type. If *wFormatTag* is WAVE_FORMAT_PCM, then *wBitsPerSample* should be equal to 8 or 16. For non-PCM formats, this member must be set according to the manufacturer's specification of the format tag. Note that some compression schemes cannot define a value for *wBitsPerSample*, so this member can be zero.

cbSize
Size, in bytes, of extra format information appended to the end of the WAVEFORMATEX structure. This information can be used by non-PCM formats to store extra attributes for the *wFormatTag*. If no extra information is required by the *wFormatTag*, this member must be set to zero. For WAVE_FORMAT_PCM formats only, this member is ignored.

Appendix A

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

Application-Level Interfaces

This section describes the interfaces and methods for incorporating speech into applications. They are intended for use at the API or application level. Some managers or interfaces may have entries also in Engine-Level Interface section. However, entries listed here apply only to the application level.

- Audio Manager
- Event Manager
- Grammar Compiler Manager
- Lexicon Manager
- Resource Manager
- Speech Recognition Manager
- Text-to-Speech Manager

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

Audio interfaces

This section provides SAPI 5.0 audio interfaces.

Audio inherits from the standard COM IStream interface. See the MSDN documentation for a complete discussion of IStream and associated methods.

- ISpAudio
- ISpMMSysAudio
- ISpStream
- ISpStreamFormat
- ISpStreamFormatConverter
- ISpTranscript

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpAudio

When to Implement

Objects implementing this interface are real-time audio streams, such as those connected to a live microphone or telephone line. ISpAudio methods allow control over the real-time behavior of the stream. IStream Read and Write methods transfer data to or from an object.

Note: The ISpAudio interface inherits from ISpStreamFormat.

Methods in Vtable Order

ISpAudio Methods	Description
SetState	Sets the state of the audio device.
SetFormat	Sets the format of the audio device.
GetStatus	Passes back the status of the audio device.
SetBufferInfo	Sets the audio stream buffer information.
GetBufferInfo	Passes back the audio stream buffer information.
GetDefaultFormat	Passes back the default audio format.
EventHandle	Returns a Win32 event handle that applications can use to wait for status changes in the I/O stream.
GetVolumeLevel	Passes back the current volume level.
SetVolumeLevel	Sets the current volume level.
GetBufferNotifySize	Retrieves the audio stream buffer size information.
SetBufferNotifySize	Sets the audio stream buffer size information.

ISpAudio::SetState

ISpAudio::SetState sets the state of the audio device.

When transitioning from the SPAS_CLOSED state to any other state, the caller should be ready to handle various error conditions, specifically, SPERR_FORMAT_NOT_SUPPORTED and SPERR_DEVICE_BUSY. Many multi-media devices do not correctly report their capabilities for handling different audio formats and fail only when an attempt is made to open the device.

Also, in many older systems, audio output devices can only be opened by a single process. In all current versions of Windows, only a single process can open an audio input device. Therefore, SPERR_DEVICE_BUSY will return if an attempt is made to open a device that is being used by a different process or thread.

```
HRESULT SetState(
   SPAUDIOSTATE   NewState,
   ULONGLONG      ullReserved
);
```

Parameters

NewState
    [in] The flag of type SPAUDIOSTATE for the new state of the audio device.
ullReserved
    [in] Reserved, do not use. This value must be zero.

Return values

Value	**Description**
S_OK	Function completed successfully.
E_INVALIDARG	*ullReserved* is not zero.
SPERR_DEVICE_BUSY	Hardware device is in use by another thread or process.
SPERR_FORMAT_NOT_SUPPORTED	Current format set by ISpAudio::SetFormat is not supported by the hardware device.

[This is preliminary documentation and subject to change.]

ISpAudio::SetFormat

ISpAudio::SetFormat sets the format of the audio device.

This method can only be called when the audio device is in the SPAS_CLOSED state. Note that successfully setting the format on a audio device does not necessarily mean the format is supported. An attempt must be made to place the device into a non-closed state (SPAS_STOP, SPAS_PAUSE or SPAS_RUN) to be sure that the device can handle the format.

The format can be retrieved by calling the ISpStreamFormat::GetFormat method.

```
HRESULT SetFormat(
   REFGUID   rguidFmtId,
   const   WAVEFORMATEX   *pWaveFormatEx
);
```

Parameters

rguidFmtId
    [in] The REFGUID for the format to set.
pWaveFormatEx
    [in] Address of the WAVEFORMATEX structure containing the wave file format information.

Return values

Value	Description
S_OK	Function completed successfully. See note about supported formats.
E_INVALIDARG	*pWaveFormatEx* is invalid or bad.
SPERR_DEVICE_BUSY	Device is not in the SPAS_CLOSED state.
SPERR_UNINITIALIZED	Audio stream not initialized.
SPERR_FORMAT_NOT_SUPPORTED	Specified format is not supported.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpAudio::GetStatus

ISpAudio::GetStatus gets the status of the audio device.

Use this method to determine whether the device is running, stopped, closed, or paused. It also determines the size of any buffered data.

```
HRESULT GetStatus(
  SPAUDIOSTATUS  *pStatus
);
```

Parameters

pStatus
[out] Pointer to the SPAUDIOSTATUS buffer.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	*pStatus* is invalid.

[This is preliminary documentation and subject to change.]

ISpAudio::SetBufferInfo

ISpAudio::SetBufferInfo sets the audio stream buffer information.

This method can be called only when the audio device is in the SPAS_CLOSED state. The SPAUDIOBUFFERINFO members must conform to the following restrictions:

SPAudioBufferInfo.ulMsMinNotification may be at most one quarter the size of SPAudioBufferInfo.ulMsBufferSize.

SPAudioBufferInfo.ulMsEventBias can be no larger than SPAudioBufferInfo.ulMsBufferSize.

```
HRESULT SetBufferInfo(
   const   SPAUDIOBUFFERINFO   *pBuffInfo
);
```

Parameters

pBuffInfo
[in] Pointer to the SPAUDIOBUFFERINFO buffer.

Return values

Value	**Description**
S_OK	Function completed successfully.
SPERR_UNINITIALIZED	Audio stream not initialized.
E_INVALIDARG	*pBuffInfo* is invalid or the parameters do not meet the criteria described above. Alternaltely
SPERR_DEVICE_BUSY	Audio device is not in the SPAS_CLOSED state.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpAudio::GetBufferInfo

ISpAudio::GetBufferInfo gets the audio stream buffer information.

```
HRESULT GetBufferInfo(
  SPAUDIOBUFFERINFO   *pBuffInfo
);
```

Parameters

pBuffInfo
[out] Pointer to the SPAUDIOBUFFERINFO buffer.

Return values

Value	**Description**
S_OK	Function completed successfully.
E_POINTER	*pBuffInfo* is invalid.

[This is preliminary documentation and subject to change.]

ISpAudio::GetDefaultFormat

ISpAudio::GetDefaultFormat gets the default audio format.

Other formats may be supported by the audio device; this format is guaranteed to work.

```
HRESULT GetDefaultFormat(
   GUID            *pFormatId,
   WAVEFORMATEX    **ppCoMemWaveFormatEx
);
```

Parameters

pFormatId
    [out] Pointer to the GUID of the default format.
ppCoMemWaveFormatEx
    [out] Address of a pointer to the WAVEFORMATEX structure that receives the wave file format information.

Return values

Value	Description
S_OK	Function completed successfully.
SPERR_UNINITIALIZED	Stream is uninitialized.
E_POINTER	At least one of *pFormatId* or *pFormatId* is invalid or bad.
E_POINTER	*pFormatId* is invalid.

[This is preliminary documentation and subject to change.]

ISpAudio::EventHandle

ISpAudio::EventHandle returns a Win32 event handle that applications can use to wait for status changes in the I/O stream.

The handle may use one of the various Win32 wait functions, such as WaitForSingleObject or WaitForMultipleObjects.

For read streams, set the event when there is data available to read and reset it whenever there is no available data. For write streams, set the event when all of the data has been written to the device, and reset it at any time when there is still data available to be played.

The caller should not close the returned handle, nor should the caller ever use the event handle after calling Release() on the audio object. The audio device will close the handle on the final release of the object.

```
HANDLE  EventHandle( void );
```

Parameters

None

Return values

Value	Description
HANDLE	Returns valid event handle.

[This is preliminary documentation and subject to change.]

ISpAudio::GetVolumeLevel

ISpAudio::GetVolumeLevel passes back the current volume level.

The volume level is on a linear scale from 0 to 10000.

```
HRESULT GetVolumeLevel(
   ULONG   *pLevel
);
```

Parameters

pLevel
[out] Pointer to the returned volume level.

Return values

Value	Description
S_OK	Function completed successfully.
SPERR_UNINITIALIZED	Audio interface is not initialized.
SPERR_DEVICE_NOT_SUPPORTED	The device is not valid or does not support volumes.
E_POINTER	*pulLevel* is invalid or bad.
E_INVALIDARG	The argument is invalid or is not the correct size.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpAudio::SetVolumeLevel

ISpAudio::SetVolumeLevel sets the current volume level.

It is on a linear scale from 0 to 10000.

```
HRESULT SetVolumeLevel(
   ULONG   Level
);
```

Parameters

Level
[in] The new volume level.

Return values

Value	Description
S_OK	Function completed successfully.

[This is preliminary documentation and subject to change.]

ISpAudio::GetBufferNotifySize

ISpAudio::GetBufferNotifySize retrieves the audio stream buffer size information. This information is used to determine when the event returned by ISpAudio::EventHandle is set or reset.

For read streams, the event is set if the audio buffered is greater than or equal to the value set in *pcbSize*, otherwise the event information is reset.

For write streams, the event is set if the audio buffered is less than the value set in *pcbSize*, otherwise the event information is reset.

```
HRESULT GetBufferNotifySize(
   ULONG   *pcbSize
);
```

Parameters

pcbSize
[out] Address of the size information, specified in bytes, that is associated with the audio stream buffer.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.
E_POINTER	Invalid pointer.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpAudio::SetBufferNotifySize

ISpAudio::SetBufferNotifySize sets the audio stream buffer size information. This information is used to determine when the event returned by ISpAudio::EventHandle is set or reset.

For read streams the event is set if the audio buffered is greater than or equal to the value set in *pcbSize*, otherwise the event information is reset.

For write streams the event is set if the audio buffered is less than the value set in *pcbSize*, otherwise the event information is reset.

```
HRESULT SetBufferNotifySize(
   ULONG   cbSize
);
```

Parameters

cbSize
[in] The size, specified in bytes, of the information associated with the audio stream buffer.

Return values

Value	Description
S_OK	Function completed successfully.
FAILED(hr)	Appropriate error message.

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpMMSysAudio

ISpMMSysAudio inherits from ISpAudio.

This is the interface to the audio implementation for the standard Windows multimedia layer (wave in and wave out). Audio objects created through an object token do not allow the ISpMMSysAudio::SetDeviceId method to work because the token specifies which audio device ID to use. If, for some reason an application wants to associate an audio object with a specific multimedia wave in or wave out device ID, it should use CoCreateInstance with CLSID_SpMMAudioOut or CLSID_SpMMAudioIn and then use the SetDeviceId method to select the desired device.

Methods in Vtable Order

ISpMMSysAudio Methods	Description
GetDeviceId	Passes back the multimedia device ID being used by the audio object.
SetDeviceId	Sets the multimedia device ID.
GetMMHandle	Passes back a multimedia audio stream handle.

[This is preliminary documentation and subject to change.]

ISpMMSysAudio::GetDeviceId

ISpMMSysAudio::GetDeviceId passes back the multimedia device ID being used by the audio object.

Initially set this device ID to WAVE_MAPPER for instances of CLSID_SpMMAudioIn or CLSID_SpMMAudioOut, which were created using CoCreateInstance. For audio objects created using an object token, the ID will always be a specific wave in or wave out device ID.

```
HRESULT GetDeviceId(
   UINT   *puDeviceId
);
```

Parameters

puDeviceId
  [out] Pointer receiving the device ID.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	*puDeviceId* is invalid.

[This is preliminary documentation and subject to change.]

ISpMMSysAudio::SetDeviceId

ISpMMSysAudio::SetDeviceId sets the multimedia device ID.

This method works only on audio objects that were not created using an object token, and only when the object is in the SPAS_CLOSED state.

```
HRESULT SetDeviceId(
   UINT   uDeviceId
);
```

Parameters

uDeviceId
[in] The device ID of the device to set.

Return values

Value	Description
S_OK	Function completed successfully.
SPERR_DEVICE_BUSY	Object is not in the SPAS_CLOSED state.
SPERR_ALREADY_INITIALIZED	Object was created using an object token.
E_INVALIDARG	*uDeviceId* is invalid. It is not set to WAVE_MAPPER or device does not exist.

ISpMMSysAudio::GetMMHandle

ISpMMSysAudio::GetMMHandle passes back a multimedia audio devicestream handle.

The audio object must not be in the SPAS_CLOSED state or this call will fail because the multimedia device will not have been opened yet. The caller must not close the passed back handle. The caller must not use the handle either after changing the state of the audio object to SPAS_CLOSED or after releasing the object.

```
HRESULT GetMMHandle(
   void   **pHandle
);
```

Parameters

pHandle
The wave in or wave out device handle.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	*pHandle* is invalid.
SPERR_UNINITIALIZED	Audio object is in the SPAS_CLOSED state.

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpStream

Note: This interface inherits from ISpStreamFormat.

Methods in Vtable Order

ISpStream Methods	Description
SetBaseStream	Sets the base address of the audio stream.
GetBaseStream	Retrieves the base address of the audio stream.
BindToFile	Binds the audio stream to the file that it identifies.
Close	Closes the audio stream.

[This is preliminary documentation and subject to change.]

ISpStream::SetBaseStream

ISpStream::SetBaseStream sets the base address of the audio stream.

```
HRESULT SetBaseStream(
    IStream                *pStream,
    REFGUID                 rguidFormat,
    const   WAVEFORMATEX   *pWaveFormatEx
);
```

Parameters

pStream
 Address of the IStream containing the base audio stream data.
rguidFormat
 Address of the data format identifier associated with the audio stream.
pWaveFormatEx
 Address of the WAVEFORMATEX structure that contains the wave file format information.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.
SPERR_UNINITIALIZED	The object has not been properly initialized.
SPERR_ALREADY_INITIALIZED	The object has already been initialized.

[This is preliminary documentation and subject to change.]

ISpStream::GetBaseStream

ISpStream::GetBaseStream retrieves the base address of the audio stream.

```
HRESULT GetBaseStream(
   IStream   **ppStream
);
```

Parameters

ppStream
Address of a pointer to the IStream that contains the audio stream.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	Invalid pointer.

[This is preliminary documentation and subject to change.]

ISpStream::BindToFile

ISpStream::BindToFile binds the audio stream to the file that it identifies.

```
HRESULT BindToFile(
   const WCHAR    *pszFileName,
   SPFILEMODE     eMode,
   const GUID     *pFormatId,
   const  WAVEFORMATEX    *pWaveFormatEx,
   ULONGLONG      ullEventInterest
);
```

Parameters

pszFileName
  Address of a null-terminated string containing the file name.
eMode
  Flags of the type SPFILEMODE for the desired file mode.

  When opening an audio wav file, specify the mode SPFM_OPEN_READONLY or SPFM_CREATE_ALWAYS, otherwise the other modes will fail.

pFormatId
  Address of the data format identifier associated with the stream.
pWaveFormatEx
  Address of the WAVEFORMATEX structure that contains the wave file format information.
ullEventInterest
  Flags of type SPEVENTENUM for the desired events.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.
SPERR_ALREADY_INITIALIZED	The object has already been initialized.

[This is preliminary documentation and subject to change.]

ISpStream::Close

ISpStream::Close closes the audio stream. Use this to validate the close operation.

```
HRESULT Close ( void );
```

Parameters

None.

Return values

Value	Description
S_OK	Function completed successfully.
FAILED (hr)	Appropriate error message.

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpStreamFormat

ISpStreamFormat inherits from IStream.

Methods in Vtable Order

ISpStreamFormat Methods	Description
GetFormat	Passes back the cached format of the stream.

[This is preliminary documentation and subject to change.]

ISpStreamFormat::GetFormat

ISpStreamFormat::GetFormat passes back the cached format of the stream.

```
HRESULT GetFormat(
   GUID           *pguidFormatId,
   WAVEFORMATEX   **ppCoMemWaveFormatEx
);
```

Parameters

pguidFormatId
The actual format of the stream being used.

ppCoMemWaveFormatEx
Address of a pointer to a WAVEFORMATEX data structure that contains the wave file format information.

Return values

Value	Description
S_OK	Function completed successfully.

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpStreamFormatConverter

ISpStreamFormatConverter inherits from ISpStreamFormat. Several methods are included to allow data conversion.

Methods in Vtable Order

ISpStreamFormatConverter Methods	Description
SetBaseStream	Sets the current audio stream.
GetBaseStream	Gets the current audio stream.
SetFormat	Sets the base stream format.
ResetSeekPosition	Resets the seek position to the start of the stream.
ScaleConvertedToBaseOffset	Converts a stream offset in the converted stream into a stream offset in the base stream.
ScaleBaseToConvertedOffset	Converts an offset in the base stream into a stream offset in the converted stream.

[This is preliminary documentation and subject to change.]

ISpStreamFormatConverter::SetBaseStream

ISpStreamFormatConverter::SetBaseStream sets the current, or base audio stream.

```
HRESULT SetBaseStream(
   ISpStreamFormat   *pStream,
   BOOL               fSetFormatToBaseStreamFormat,
   BOOL               fWriteToBaseStream
);
```

Parameters

pStream
[in] Address of an ISpStreamFormat containing the base audio stream data.
fSetFormatToBaseStreamFormat
[in] Flag specifies that the stream will be set to the same format as the base stream.

If TRUE, then format of format converter stream will be set to same format as base stream (set up as a pass-through). If *pStream* == NULL and this is set to TRUE, then format of stream is reset.

fWriteToBaseStream
[in] Flag specifies that the steam will be written to the base stream.

Return values

Value	Description
S_OK	Function completed successfully.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpStreamFormatConverter::GetBaseStream

ISpStreamFormatConverter::GetBaseStream gets the current audio stream.

This parameter can be NULL if that information is not required. Use this method to simply test if there is a stream by calling it and checking for a return code of S_FALSE.

```
HRESULT GetBaseStream(
   ISpStreamFormat   **ppStream
);
```

Parameters

ppStream
[out] The current base audio stream.

Return values

Value	Description
S_OK	Function completed successfully.
S_FALSE	No base stream is present.
E_POINTER	Pointer is bad or invalid.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpStreamFormatConverter::SetFormat

ISpStreamFormatConverter::SetFormat sets the base stream format.

```
HRESULT SetFormat(
   REFGUID              rguidFormatIdOfConvertedStream,
   const WAVEFORMATEX   *pWaveFormatExOfConvertedStream
);
```

Parameters

rguidFormatIdOfConvertedStream
[in] Address of the data format identifier associated with the converted stream.
pWaveFormatExOfConvertedStream
[in] Address of the WAVEFORMATEX structure containing the wave file format information of the converted stream.

Return values

Value	Description
S_OK	Function completed successfully.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpStreamFormatConverter::ResetSeekPosition

ISpStreamFormatConverter::ResetSeekPosition resets the seek position to the start of the stream.

```
HRESULT ResetSeekPosition( void );
```

Parameters

None.

Return values

Value	Description
S_OK	Function completed successfully.
SPERR_UNINITIALIZED	Current stream base is uninitialized.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpStreamFormatConverter::ScaleConvertedT

ISpStreamFormatConverter::ScaleConvertedToBaseOffset converts a stream offset in the converted stream into an offset in the base stream.

```
HRESULT ScaleConvertedToBaseOffset(
   ULONGLONG     ullOffsetConvertedStream,
   ULONGLONG    *pullOffsetBaseStream
);
```

Parameters

ullOffsetConvertedStream
: The offset of the current stream.

pullOffsetBaseStream
: The new offset in the base stream.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	*pullConvertedOffset* is invalid.
SPERR_UNINITIALIZED	SetBaseStream has not been called successfully.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpStreamFormatConverter::ScaleBaseToConv

ISpStreamFormatConverter::ScaleBaseToConvertedOffset converts an offset in the base stream into an offset in the converted stream.

```
HRESULT ScaleBaseToConvertedOffset(
   ULONGLONG   ullOffsetBaseStream,
   ULONGLONG  *pullOffsetConvertedStream
);
```

Parameters

ullOffsetBaseStream
: The current offset in the base stream.

pullOffsetConvertedStream
: The new offset in the converted stream.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	*pullOffsetConvertedStream* is bad or invalid.
SPERR_UNINITIALIZED	*ullOffsetBaseStream* is less than the initial seek position of the current steam. **pullOffsetConvertedStream* is set to 0xFFFFFFFFFFFFFFFF.
SPERR_UNINITIALIZED	*SetBaseStream* has not been called successfully.
FAILED (hr)	Appropriate error message.

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpTranscript

Methods in Vtable Order

ISpTranscript Methods	Description
GetTranscript	Gets the current transcript.
AppendTranscript	Adds the current text to the transcript.

[This is preliminary documentation and subject to change.]

ISpTranscript::GetTranscript

ISpTranscript::GetTranscript gets the current transcript.

```
HRESULT GetTranscript(
   WCHAR   **ppszTranscript
);
```

Parameters

ppszTranscript
[out, string] A pointer to the transcription string.

Return values

Value	Description
S_OK	Function completed successfully. *ppszTranscript* contains a CoTaskMemAllocated string.
E_INVALIDARG	*ppszTranscript* is bad or invalid.
E_OUTOFMEMORY	Exceeded available memory.
SPERR_UNINITIALIZED	Object has not been initialized.
E_POINTER	*ppszTranscript* is bad or invalid.
S_FALSE	No transcript is present.
FAILED (hr)	Appropriate error message.

Example

```
    HRESULT hr = S_OK;
    CComPtr<IStream> cpWavStream;

    hr = SPOpenWavFile(L"Created.Wav", NULL, &cpWavStream);
    CComQIPtr<ISpTranscript> cpTrans(cpWavStream);
    CSpDynamicString dstrTranscript;
    cpTrans->GetTranscript(&dstrTranscript);
    WCHAR * psz = dstrTranscript;
    pVoice->SetInterest(SPFEI_WORDBOUNDARY | SPFEI_END_INPUT_STREAM, 0);
    hr = pVoice->SpeakStream(cpWavStream, NULL, 0, SPF_ASYNC, NULL);

    while (TRUE)
    {
        SPVOICESTATUS Stat;
        pVoice->WaitForNotifyEvent(INFINITE);
        pVoice->GetStatus(&Stat, NULL);
        if (Stat.dwRunningState & SPRS_DONE) break;

        while (static_cast<ULONG>(psz - dstrTranscript) < (Stat.ulInputWordPos + S
        {
            wprintf(L"%lc", *psz++);
        }
    }

    //Print the remainder (if any)
    wprintf(L"%s\n", psz);
    pVoice->SetNotifySink(NULL);
```

[This is preliminary documentation and subject to change.]

ISpTranscript::AppendTranscript

ISpTranscript::AppendTranscript adds the current text to the transcript.

```
HRESULT AppendTranscript(
  const WCHAR   *pszTranscript
);
```

Parameters

pszTranscript
[in, string] The text of the transcript. If *pszTranscript* is NULL, then the current transcript is deleted. Otherwise, the text is appended to the current transcript.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*pszTranscript* is bad or invalid.
E_OUTOFMEMORY	Exceeded available memory.
FAILED (hr)	Appropriate error message.

Example

```
HRESULT hr;
CComPtr<IStream> cpWavStream;

// Wrapper for ISpWavStream::Create
hr = SPCreateWavFile(L"Created.Wav", SPDFID_22kHz16BitMono, &cpWavStream);
if (SUCCEEDED(hr))
{
    hr = pVoice->SetOutput(cpWavStream, NULL);
    CComQIPtr<ISpTranscript> cpTrans(cpWavStream);
    cpTrans->AppendTranscript(L"This is a simple sample sentence");

    if (SUCCEEDED(hr))
    {
        //A sample of generated speech written to a WAV file
        hr = pVoice->Speak( L"This is a simple sample sentence.", 0, 0, NULL);
        pVoice->SetOutput(NULL,  NULL);
    }
}
//Start the media player on the created file
pVoice->Speak( L"Press the play button to play the recorded audio.", 0, 0, NUL
cpWavStream.Release();
if (SUCCEEDED(hr))
{
    ::ShellExecute(NULL, "open", _T("Created.Wav"), NULL, NULL, SW_SHOWNORMAL)
}
```

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

Eventing interfaces

This section provides SAPI 5.0 event information.

- ISpNotifySource
- ISpNotifySink
- ISpNotifyTranslator
- ISpEventSink
- ISpEventSource
- ISpNotifyCallback

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpNotifySource

In both speech synthesis and speech recognition, applications receive notifications when words have been spoken or when phrases have been recognized. SAPI components that generate notifications implement an ISpNotifySource.

The ISpNotifySource and ISpNotifySink interfaces by themselves only provide a mechanism for a notification but no information on the events that caused the notification. With an ISpEventSource object, an application can retrieve information about the events that caused the notification. An ISpEventSource also provides the mechanism to filter and queue events. By default, an application (really an ISpNotifySink) receives no notifications from ISpEventSource until SetInterests has been called to specify on which events to notify or queue.

When an application is notified of an event that is not queued, an application will take measures based on which event sink receives the notification. From context, an application might know exactly what it needs to do, or it may need to interact with the components which sent the notifications. If an application is notified of an event which is queued, then the application will call ISpEventSource::GetEvents to retrieve the actual events that caused a notification.

When to Implement

Implement the ISpNotifySource interface during initialization to set the default action for how an event source notifies the receiver.

Methods in Vtable Order

ISpNotifySource Methods	Description
SetNotifySink	Sets up the instance to make free-threaded calls through ISpNotifySink::Notify.
SetNotifyWindowMessage	Sets a window callback function to receive notifications as window messages.
SetNotifyCallbackFunction	Sets a callback function to receive notifications.
SetNotifyCallbackInterface	Enables an object derived from ISpTask to receive notifications.
SetNotifyWin32Event	Sets up a Win32 event object to be used by this instance.
WaitForNotifyEvent	A blocking call in response to a SAPI notification event.
GetNotifyEventHandle	Retrieves notifications via Win32 events.

[This is preliminary documentation and subject to change.]

ISpNotifySource::SetNotifySink

ISpNotifySource::SetNotifySink sets up the instance to make free-threaded calls through ISpNotifySink::Notify.

```
HRESULT SetNotifySink(
   ISpNotifySink     *pNotifySink
);
```

Parameters

pNotifySink
: [in] Pointer to the notification method. May be NULL if no default action is required.

Return values

Value	Description
S_OK	Function completed successfully.
E_FAIL	Interface not initialized.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpNotifySource::SetNotifyWindowMessage

ISpNotifySource::SetNotifyWindowMessage sets up the instance to send window messages to a specified window.

```
HRESULT SetNotifyWindowMessage(
   HWND     hWnd,
   UINT     Msg,
   WPARAM   wParam,
   LPARAM   lParam
);
```

Parameters

hWnd
: [in] Handle to the window whose message handler function will receive SAPI notifications.

Msg
: [in] Message number which will be passed into the message handler function of the window *hWnd*.

wParam
: [in] *wParam* that will be passed into the message handler function of the window *hWnd*.

lParam
: [in] *lParam* that will be passed into the message handler function of the window *hWnd*.

Return values

Value	Description
S_OK	Function completed successfully.
E_FAIL	Interface not initialized.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpNotifySource::SetNotifyCallbackFunction

ISpNotifySource::SetNotifyCallbackFunction sets up this instance to send notifications via a standard C-style callback function.

```
HRESULT SetNotifyCallbackFunction(
   SPNOTIFYCALLBACK    *pfnCallback,
   WPARAM               wParam,
   LPARAM               lParam
);
```

Parameters

pfnCallback
[in] The notification callback function to be used.
wParam
[in] Constant word value that will be passed to the *pfnCallback* function when it is called.
lParam
[in] Constant long value that will be passed to the *pfnCallback* function when it is called.

Return values

Value	Description
S_OK	Function completed successfully.
E_FAIL	Interface not initialized.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpNotifySource::SetNotifyCallbackInterface

ISpNotifySource::SetNotifyCallbackInterface sets up this instance to call the virtual method ISpNotifyCallback::NotifyCallback for notifications.

```
HRESULT SetNotifyCallbackInterface(
  ISpNotifyCallback    *pSpCallback,
  WPARAM                wParam,
  LPARAM                lParam
);
```

Parameters

pSpCallback
[in] A pointer to an application-defined implementation of the ISpNotifyCallback interface.

wParam
[in] Constant word value that will be passed to the NotifyCallback method when it is called.
lParam
[in] Constant long value that will be passed to the NotifyCallback method when it is called.

Return values

Value	**Description**
S_OK	Function completed successfully.
E_FAIL	Interface not initialized.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpNotifySource::SetNotifyWin32Event

ISpNotifySource::SetNotifyWin32Event sets up a Win32 event object to be used by this instance.

For an explanation of Win32 event objects, see the Win32 Platform SDK documentation. Once an event object has been initialized for this instance, use either the WaitForNotifyEvent and GetNotfyEventHandle methods. Note that Win32 event objects and SAPI events are different notifications.

```
HRESULT   SetNotifyWin32Event   ( void );
```

Parameters

None

Return values

Value	**Description**
S_OK	Function completed successfully.
E_FAIL	Interface not initialized.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpNotifySource::WaitForNotifyEvent

ISpNotifySource::WaitForNotifyEvent is a blocking call in response to a SAPI notification event.

A blocking call returns when a SAPI notification has fired, a timeout has passed or the initialized Win32 event object has signaled. This call is only valid after calling InitWin32Event.

```
HRESULT WaitForNotifyEvent(
   DWORD   dwMilliseconds
);
```

Parameters

dwMilliseconds
: [in] Number of milliseconds for the timeout on a blocking call. If set to INFINITE, there is no timeout.

Return values

Value	Description
S_OK	Function completed successfully.
SPERR_UNINITIALIZED	InitWin32Event did not return successfully or has not been called.
E_FAIL	Interface not initialized.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpNotifySource::GetNotifyEventHandle

ISpNotifySource::GetNotifyEventHandle retrieves the Win32 event object handle.

```
HANDLE   GetNotifyEventHandle   ( void );
```

Parameters

None

Return values

Value	Description
Win32 event object	Initialized by InitWin32Event on this ISpNotifyTranslator instance.
NULL	Interface not initialized.
FAILED (hr)	Appropriate error message.

with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpNotifySink

In both speech synthesis and speech recognition, applications receive notifications when words have been spoken or when phrases have been recognized. SAPI components that generate notifications implement an ISpNotifySource.

The ISpNotifySource and ISpNotifySink interfaces by themselves only provide a mechanism for a notification but no information on the events that caused the notification. With an ISpEventSource object, an application can retrieve information about the events that caused the notification. An ISpEventSource also provides the mechanism to filter and queue events. By default, an application (really an ISpNotifySink) receives no notifications from ISpEventSource until SetInterests has been called to specify on which events to notify or queue.

When an application is notified of an event which is not queued, an application will take measures based on which event sink is receiving the notification. From context an application might know exactly what it needs to do, or it may need to interact with the components which sent the notifications. If an application is notified of an event which is queued, then the application will call ISpEventSource::GetEvents to retrieve the actual events that caused a notification.

When to Implement

Implement the ISpNotifySink interface when an ISpNotifySink object is to be notified.

Methods in Vtable Order

ISpNotifySink Methods	Description
Notify	Notifies the ISpNotifySink object.

[This is preliminary documentation and subject to change.]

ISpNotifySink::Notify

ISpNotifySink::Notify notifies an ISpNotifySink object when an event has occurred.

If a message has not already been posted, this method either sets an event or posts a message to the private window. Often an application will call specific status functions based on the context of where a notification has come from. For instance, an application receiving a notification from an ISpVoice instance can call ISpVoice::GetStatus to find out the most recent cause of a Notify call.

```
HRESULT   Notify  ( void );
```

Parameters

None

Return values

Value	Description
S_OK	Function completed successfully.
SPERR_UNINITIALIZED	Object has not been properly initialized.

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpNotifyTranslator

ISpNotifyTranslator inherits from ISpNotifySink.

The component CLSID_SpNotify, provides this interface for reuse by implementers of the ISpNotifySource interface. It provides a proxy object to other calls so that a developer does not need to re-address threading issues. Many, but not all, of these methods are identical to those in ISpNotifySource.

When to Use

ISpNotifyTranslator may be used in applications to pass in specific Win32 events.

Methods in Vtable Order

ISpNotifyTranslator Methods	Description
InitWindowMessage	Enables a window callback function to receive notifications as window messages.
InitCallback	Enables a callback function to receive notifications.
InitSpNotifyCallback	Enables an object derived from ISpTask to receive notifications.
InitWin32Event	Sets up a Win32 event object to be used by this instance.
Wait	A blocking call in response to a SAPI notification event.
GetEventHandle	Retrieves notifications via Win32 events.

[This is preliminary documentation and subject to change.]

ISpNotifyTranslator::InitWindowMessage

ISpNotifyTranslator::InitWindowMessage sets up the instance to send window messages to a specified window.

```
HRESULT InitWindowMessage(
   HWND       hWnd,
   UINT       Msg,
   WPARAM     wParam,
   LPARAM     lParam
);
```

Parameters

hWnd
[in] Handle to the window whose message handler function will receive SAPI notifications.
Msg
[in] Message number which will be passed into the message handler function of the window *hWnd.*
wParam
[in] *wParam* that will be passed into the message handler function of the window *hWnd.*
lParam
[in] *lParam* that will be passed into the message handler function of the window *hWnd*

Return values

Value	Description
S_OK	Function completed successfully.
SPERR_ALREADY_INITIALIZED	Interface is already initialized.
E_INVALIDARG	*hWnd* is invalid or bad.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpNotifyTranslator::InitCallback

ISpNotifyTranslator::InitCallback sets up this instance to send notifications via a standard C-style callback function.

```
HRESULT InitCallback(
   SPNOTIFYCALLBACK    *pfnCallback,
   WPARAM               wParam,
   LPARAM               lParam
);
```

Parameters

pfnCallback
[in] The notification callback function to be used.
wParam
[in] Constant word value that will be passed to the *pfnCallback* function when it is called.

lParam
[in] Constant long value that will be passed to the *pfnCallback* function when it is called.

Return values

Value	**Description**
S_OK	Function completed successfully.
SPERR_ALREADY_INITIALIZED	Interface is already initialized.
E_INVALIDARG	*pfnCallback* is invalid or bad.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpNotifyTranslator::InitSpNotifyCallback

ISpNotifyTranslator::InitSpNotifyCallback sets up this instance to call the virtual method ISpNotifyCallback::NotifyCallback for notifications.

```
HRESULT InitSpNotifyCallback(
   ISpNotifyCallback    *pSpCallback,
   WPARAM                wParam,
   LPARAM                lParam
);
```

Parameters

pSpCallback
[in] A pointer to an application-defined implementation of the ISpNotifyCallback interface.
wParam
[in] Constant word value that will be passed to the NotifyCallback method when it is called.
lParam
[in] Constant long value that will be passed to the NotifyCallback method when it is called.

Return values

Value	**Description**
S_OK	Function completed successfully.
SPERR_ALREADY_INITIALIZED	Interface is already initialized.
E_INVALIDARG	*pSpNotifyCallback* is invalid or bad.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpNotifyTranslator::InitWin32Event

ISpNotifyTranslator::InitWin32Event sets up a Win32 event object to be used by this instance.

This method is applicable only with objects using Win32 events. For an explanation of Win32 event objects see the Win32 Platform SDK documentation.

Once an event object has been initialized for this instance, then use WaitForNotifyEvent and GetNotfyEventHandle methods. Win32 event objects and SAPI events are different. It is identical to ISpNotifySource::SetNotifyWin32Event except with two additional parameters.

```
HRESULT InitWin32Event(
   [in] HANDLE   hEvent,
   [in] BOOL     fCloseHandleOnRelease
);
```

Parameters

hEvent
: Handle of an existing Win32 event object for the application to use with ISpNotifyTranslator. An ISpNotifyTranslator object will take care of all Win32 event object details. May be NULL, in which case an application may call ISpNotifyTranslator::Wait to block a thread until a SAPI notification occurs.

fCloseHandleOnRelease
: Specifies whether the *hEvent* handle should be closed when the object is released. If *hEvent* is NULL, then this ignore this parameter and always close the handle upon release of the object.

Return values

Value	Description
S_OK	Function completed successfully.
SPERR_ALREADY_INITIALIZED	Interface is already initialized.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpNotifyTranslator::Wait

ISpNotifyTranslator::Wait is a blocking call in response to a SAPI notification event.

A blocking call returns when a SAPI notification has fired, a timeout has passed or the initialized WIN32 event object has signaled. This method is applicable only with objects using Win32 events.

```
HRESULT Wait(
   DWORD   dwMilliseconds
);
```

Parameters

dwMilliseconds
[in] Number of milliseconds for the timeout on a blocking call. If set to INFINITE, there is no timeout.

Return values

Value	Description
S_OK	Function completed successfully.
S_FALSE	The event was not set and the call was timed out.
SPERR_UNINITIALIZED	InitWin32Event did not return successfully or has not been called.

[This is preliminary documentation and subject to change.]

ISpNotifyTranslator::GetEventHandle

ISpNotifyTranslator::GetEventHandle returns the Win32 event object handle initialized by InitWin32Event on this ISpNotifyTranslator instance. This method is applicable only with objects using Win32 events.

The handle is not a duplicated handle and should not be closed by the caller.

```
HANDLE   GetEventHandle   ( void );
```

Parameters

None

Return values

Value	Description
handle	The handle to the event
INVALID_HANDLE_VALUE	Call failed.

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpEventSink

This interface allows event sources to send events directly to an event sink through a free-threaded call.

When to Implement

This interface is never used by most applications.

Methods in Vtable Order

ISpEventSink Methods	Description
AddEvents	Adds events directly to an event sink.
GetEventInterest	Passes back the event interest for the voice.

[This is preliminary documentation and subject to change.]

ISpEventSink::AddEvents

ISpEventSink::AddEvents adds events directly to an event sink.

```
HRESULT AddEvents(
   const SPEVENT    *pEventArray,
   ULONG             ulCount
);
```

Parameters

pEventArray
Pointer to an array of SPEVENT event structures.
ulCount
Number of event structures being passed in.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*pEventArray* is bad or invalid
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpEventSink::GetEventInterest

ISpEventSink::GetEventInterest passes back the event interest for the voice.

```
HRESULT GetEventInterest(
   ULONGLONG   *pullEventInterest
);
```

Parameters

pullEventInterest
[out] Set of flags of type SPEVENTENUM defining the event interest.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	Pointer bad or invalid.
FAILED(hr)	Appropriate error message.

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpEventSource

This interface provides functionality for events which can be queued, filtered or can cause a notification to ISpNotifySink.

The ISpEventSource inherits from the ISpNotifySource interface.

Methods in Vtable Order

ISpEventSource Methods	Description
SetInterest	Sets the types of events.
GetEvents	Retrieves and removes the queued events.
GetInfo	Returns queuing and interest information about the event.

[This is preliminary documentation and subject to change.]

ISpEventSource::SetInterest

ISpEventSource::SetInterest sets the type of events which will invoke a notification and become queued.

If SetInterest is never called, the speech recognition engine defaults to SPEI_RECOGNITION as the sole event interest. No events will be passed through if both parameters are set to zero.

```
HRESULT SetInterest(
   ULONGLONG   ullEventInterest,
   ULONGLONG   ullQueuedInterest
);
```

Parameters

ullEventInterest
[in] Event ID flags indicating which events should invoke a notification to the event sink that this event source uses.

ullQueuedInterest
[in] Event ID flags indicating which events should be queued prior to ISpEventSource::GetEvents. The event flags set here must also be set in *dwEventInterest*.

Return values

Value	Description
S_OK	Function completed successfully.
E_FAIL	Interface not defined.
FAILED(hr)	Appropriate error message.

ISpEventSource::GetEvents

ISpEventSource::GetEvents retrieves and removes the events which have been queued.

```
HRESULT GetEvents(
   ULONG     ulCount,
   SPEVENT  *pEventArray,
   ULONG    *pulFetched
);
```

Parameters

ulCount
[in] Maximum number of events that SPEVENT structures can return.

pEventArray
[out] Pointer to array of SPEVENT structures. Each returned event is written to one of these SPEVENT structures.

pulFetched
[out] Pointer to the number of events returned. This number represents the earliest events to take place. These events are then removed from the queue. The events not returned are left for a future call to GetEvents. It is possible that by the time an application calls GetEvents, another

thread has processed the events and there are no events to be returned. This may be the result of subsequent Notify calls.

Return values

Value	Description
S_OK	Function completed successfully.
E_FAIL	Interface not valid.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpEventSource::GetInfo

ISpEventSource::GetInfo passes back the information about the event.

```
HRESULT GetInfo(
   SPEVENTSOURCEINFO   *pInfo
);
```

Parameters

pInfo
: [out] Pointer to a SPEVENTSOURCEINFO structure about the event.

Return values

Value	Description
S_OK	Function completed successfully.
E_FAIL	Interface not valid.
FAILED(hr)	Appropriate error message.

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpNotifyCallback

Note: This is not a COM interface.

Methods in Vtable Order

ISpNotifySource Methods	Description
NotifyCallback	Sets the notification mechanism for a particular instance.

[This is preliminary documentation and subject to change.]

ISpNotifyCallback::NotifyCallback

ISpNotifyCallback::NotifyCallback sets the notification mechanism for a particular instance. This method is not required to be defined and implementation is unique to the application.

```
HRESULT NotifyCallback(
   WPARAM   wParam,
   LPARAM   lParam
);
```

Parameters

wParam
  [in] *wParam* that will be passed into the message handler function of the window *hWnd.*
lParam
  [in] *lParam* that will be passed into the message handler function of the window *hWnd.*

Return values

Return values are application dependent

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

Grammar Compiler Manager

The following section covers:

- Text grammar format
- ISpGrammarBuilder

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

Text grammar format

The context-free grammar (CFG) format in SAPI 5.0 defines the structure of grammars and grammar rules. Extensible Markup Language (XML) using the tagging language. The CFG compiler transforms the XML tags defining the grammar elements into a binary format used by speech engines. This compiling process can be performed either before or during application runtime. Speech recognition engines use CFGs to constrain the user's words to words it will recognize.

The following section covers:

- Text grammar format overview
- Syntax and terminology
- Grammar rules
- Designing grammar rules
- Using grammar rules

[This is preliminary documentation and subject to change.]

Text grammar format overview

The Extensible Markup Language (XML) format inside a GRAMMAR XML element (block), is an "expert–only–readable" declaration of a grammar that a speech application uses to accomplish the following:

- Improve recognition accuracy by restricting and indicating to an engine what words it should expect.
- Improve translation of recognized speech into application actions. This is made easier by providing "semantic tags," (property name, and value associations) to words/phrases declared inside the grammar.

A GRAMMAR XML element (block) appears in a XML source code file. The XML source is compiled into a binary grammar format and is the format used by SAPI during application runtime.

The following section covers:

- Extensible Markup Language (XML)
- Attributes
- Contents
- How SAPI utilizes XML information
- Frequently used definitions
- Non–empty concatenated recognition contents

Extensible Markup Language

The textual grammar format is an application of the XML. Every XML element consists of a start tag (<SOME_TAG>) and an end tag (</SOME_TAG>) with a case-sensitive tag name and contents between these tags. The start tag and the end tag are the same if the element is empty. For example, the tag (<SOME_TAG/>). More information about XML and the XML specification is available at: http://www.w3.org/TR/REC-xml.

Attributes

Attributes of an XML element appear inside the start tag. Each attribute is in the form of a name followed by an equal sign followed by a string which must be surrounded by either single or double quotation marks. An attribute of a given name may only appear once in a start tag.

In summary, the literal string cannot contain either < or ', if the string is surrounded by single quotation marks. It may not contain ", if the string is surrounded by double quotation marks. Furthermore, use all ampersand (&) characters only in an entity reference such as &amp; and &gt;. When a literal string is parsed, the resulting replacement text will resolve all entity references such as &gt; into its corresponding text, such as >. In this specification, only the resulting replacement text needs to be defined for attribute value strings. More information about XML and the XML specification is available at: http://www.w3.org/TR/REC-xml.

Contents

The contents of an element consists of text or subelements. Formal definitions of valid contents in this specification are provided as regular and "multi-set" expressions. The pseudo-element name "Text" indicates untagged text. With these definitions, the XML specification defines the exact file syntax details.

Back to top

How SAPI utilizes XML information

SAPI uses XML content in the following two methods:

1. The SAPI context-free grammar compiler, compiles the XML grammar into a binary grammar format. The compiled binary grammar is loaded into the SAPI runtime environment from a file, memory, or object (.DLL) resource.
2. The speech recognition (SR) engine queries the runtime environment for available grammar information.

Back to top

Frequently used definitions

Untagged text declaring a sequence of words that the recognition engine will recognize. Tentatively this text is only the not-necessarily-phonetic representation of words used for reading words whose pronunciation is unknown to the user (for example, for Japanese, kana, not kanji); this form will be called the spelling form. In further definitions in this section, *Text* will be referenced as though it were a pseudo-element.

Back to top

Non–empty concatenated recognition contents

The contents of a number of XML elements in this specification such as, the P element, contain a sequence of grammar constructs which are concatenated together (one grammar construct after another). These grammar elements must be recognized in order for the contents defined to be recognized.

The contents must be one of the following (and not both):

Text and any number of L, P, O, or RULEREF elements in any order with at least one **L**, **P**, or **RULEREF**.

For more information on the use of XML grammars, please see the Syntax and terminology section.

Back to top

[This is preliminary documentation and subject to change.]

Syntax and terminology

The tags used for in the Speech Text Grammar Format (STGF) are defined using the following XML syntax:

Element	**Attributes**	**Description**
GRAMMAR	LANGID, WORDTYPE, LEXDELIMITER	Grammar definition
DEFINE	None	Defines grammar constants.
ID	NAME, VAL, VALSTR	Defines property name id. (10 bit)
RULE	NAME, ID, TOPLEVEL, EXPORT, INTERPRETER, DYNAMIC, TEMPLATE	Rule definition *(non-terminal)*
RULEREF	NAME, REFID, OBJECT, URL, PROPNAME, PROPID, VAL, VALSTR, WEIGHT	Rule reference *(non-terminal)*
PHRASE or P	PROPNAME, PROPID, VAL, VALSTR, PRON, DISP, MIN, MAX, WEIGHT	Phrase

OPT or O	PROPNAME, PROPID, VAL, VALNUM, MAX, MIN	Optional phrase
LIST or L	PROPNAME, PROPID, VAL, VALSTR	List of alternate phrase elements.
DICTATION	MIN, MAX, PROPID	Transition to a dictation grammar.
RESOURCE	NAME	
TEXTBUFFER	PROPNAME, PROPID, WEIGHT	Transition to a textbuffer grammar.
WILDCARD	None	Garbage identifier for one or more non-silence sounds.

Back to top

GRAMMAR

Grammar definition

The top-level XML element containing all other XML elements needed to declare one grammar.

Tag name:	**GRAMMAR**
Contents:	One or more RULE elements.
Contents (formally):	<RULE>+, <DEFINE>?

Attributes:

LANGID
String specifying the language identifier associated with the grammar. The language identifier is specified as a hexadecimal value. For example, the LANGID for English (US) expressed in the hexadecimal form is 0x0409.

WORDTYPE
String specifying the grammar word type. One of the grammar word types specified in the SPGRAMMARWORDTYPE enumeration sequence. **Note:** Only SPWT_LEXICAL is supported in this release of SAPI.

LEXDELIMITER

Back to top

DEFINE

The DEFINE tag specifies a group of ID tags.

Attributes:

None.

Back to top

ID

The ID tag defines named constants for RULE, PROPNAME elements.

Attributes:

NAME
The name of the property id to be defined. Single or double quotation marks surround valid entries.

VAL
Integer value associated with NAME in the range of 0 to 1023.

Back to top

RULE

Rule definition *(non-terminal)*

Defines a grammar rule, (non-terminal in CFG terminology) only for use internally within a grammar. A rule defined in a RULE element cannot be referenced by another grammar and cannot be activated or deactivated at runtime. For more information on grammar types, see SPCFGRULEATTRIBUTES. The tag name is RULE, the contents must be non-empty concatenated recognition contents and the attributes are as follows:

Attributes:

NAME
(Required) Textual case-sensitive name of rule to be referenced internally and externally to this grammar. These rules may be activated and deactivated at runtime. Other grammars reference these rules. The replacement text string resulting from this attribute value must satisfy the requirements for a rule name in the binary grammar format. The name must be unique within a grammar.

ID
Specifies the constant value or VARIANT type (VT_UI4) identifying the RULE.

TOPLEVEL
Attribute that indicates that this is a top-level rule. Activate and deactivate top-level rules individually by the application. The value of this attribute, either "ACTIVE" or "INACTIVE" (default) indicates whether or not the rule should be active after loading.

Note: When a grammar rule is imported by another grammar rule, the "INACTIVE" state of a rule is assumed.

EXPORT
Specifies if the rule can be imported by another grammar rule. Set the attribute value to either 0 or 1 to control the state of this rule. For example, set the attribute to EXPORT="1" to enable other grammar rules to import the rule; set the attribute to EXPORT="0" when the rule is not intended to be imported by another rule.

INTERPRETER
Value indicating whether this is an interpreted grammar rule. Set the attribute value to either 0 or 1 to control the state of this rule. For example, set the attribute to INTERPRETER="1", to indicate this is an interpreted rule; set the attribute to INTERPRETER="0" when the grammar rule is not intended as an interpreted rule.

DYNAMIC

09752195 .122600

Value indicating whether this is a dynamic rule. Set the attribute value to either 0 or 1 to control the state of this rule. For example, set the attribute to DYNAMIC="1", to use the rule dynamically; set the attribute to DYNAMIC="0" when the rule is not intended for dynamic use.

Note: When specifying that a grammar RULE be used dynamically, its contents must be empty. When a grammar RULE is dynamic its contents are modifiable.

TEMPLATE
Specifies the contents of the RULE attribute are replaced by the string value of the PROPNAME. For example, TEMPLATE="$PROPNAME$" is replaced by the contents of PROPNAME.

⩯ Back to top

RULEREF

Rule reference *(non-terminal)*

Use this element inside the contents of a rule definition (RULE) to reference another defined rule.

Tag name:	**RULEREF**
Contents:	Empty (no contents)

Attributes:

NAME
Specifies the name of the referenced rule. A rule that has not yet been declared in the file may be referenced.

REFID
Constant value or VARIANT type (VT_UI4) identifying the RULEREF.

OBJECT
Specifies the class identifier (CLSID) or programmatic identifier (ProgID) that is associated with the RULEREF.

URL
Specifies that the referenced rule should be loaded from a stored file, resource, or Internet location.
file://directory_name/some_file_name.xml
res://directory_name/some_resource.dll
http://www.microsoft.com/some_resource.dll

PROPNAME
(Optional) except if a VAL attribute is present.
The case-sensitive and possibly non-unique name of zero length whose XML replacement text (see XML attribute syntax above) is the semantic property name to be associated with recognition of this rule in the context of wherever this tag reference is present. Wherever this rule reference element is present, all property name/value pairs recognized by this rule will add PROPNAME to the front of the property name followed by a period.

PROPID
(Optional) The identifier of the PROPNAME element.

VAL
(Optional) Semantic value for property specified by attribute PROPNAME.
The recognized text of this rule reference will be used as the property value if this attribute is omitted when a PROPNAME is present.

VALSTR

(Optional) String containing the identifier of the VAL element.

WEIGHT

Specifies the relative list position of the RULEREF and is expressed as a float value.

Back to top

PHRASE or P

Phrase

The tag name is P, the contents must be non-empty, concatenated, recognition contents (as defined above). These attributes are:

Attributes:

PROPNAME

The replacement text (see XML attribute syntax above) of this attribute value is the name of the semantic property to be associated with the recognition of this expression.

PROPID

(Optional) The identifier of the PROPNAME element.

VAL

(Optional) Semantic value for property specified by attribute PROPNAME.

VALSTR

(Optional) String containing the value identifier of the property.

PRON

Specifies a pronunciation for a single text word in the SAPI phoneme set.
For more phoneme related information, please see the American English phoneme representation section.

DISP

Specifies the string contents of the display form of a text phrase element. The string containing the display form can be from zero to 255 characters in length.

MIN

(Optional) The default value for this is 1. The valid range of values for this is 0 to 255 and must be less than the value specified in MAX. **Note**: The value specified by MAX will be used when the specified MIN value is greater than the MAX value.

MAX

(Optional) The default value for this is 1. The valid range of values for this is 1 to 255, or indicated by "INF" in text.
This value indicates the maximum number of times valid recognitions of this element's contents may be recognized repeatedly. A value "INF" indicates that any number of recognitions may occur.

WEIGHT

Specifies the relative list position of the PHRASE and is expressed as a float value.

Back to top

OPT or O

Optional phrase

This element is similar to the **P** element. The exception being that the **O** element is optional. An associated property name and value pair will be generated only if the contents of this element are recognized.

Contents:	Text or any number of L, P, O, or RULEREF elements in any order.
Contents (formally):	**Text | (L | P | O | RULEREF)+**

Attributes:

PROPNAME
The replacement text (see XML attribute syntax above) of this attribute value is the name of the semantic property to be associated with the recognition of this expression.

PROPID
(Optional) The identifier of the PROPNAME element.

VAL
(Optional) Semantic value for the property specified by attribute PROPNAME.

VALSTR
(Optional) String containing the value identifier of the PROPNAME element.

MAX
(Optional) The default value for this is 1. The valid range of values for this is 1 to 255, or indicated by "INF" in text.

This value indicates the maximum number of times valid recognitions of this element's contents may be recognized repeatedly. A value "INF" indicates any number of recognitions may occur.

MIN
(Optional) The default value for this is 1. The valid range of values for this is 0 to 255 and must be less than the value specified in MAX. **Note**: The value specified by MAX will be used when the specified MIN value is greater than the MAX value.

This value indicates the minimum number of times valid recognitions of this element's contents may be recognized repeatedly.

Back to top

LIST or L

List of alternate phrase elements

Defines an expression of alternate phrase recognitions. Each subelement represents a possible separate recognition in place of this element.

Tag name:	**L**
Contents (formally):	**P+, L, RULEREF**

Attributes:

PROPNAME
The replacement text (see XML attribute syntax above) of this attribute value is the name of the semantic property to be associated with the recognition of this expression.

PROPID
(Optional) The identifier of the PROPNAME element.

VAL
(Optional) Semantic value for the property specified by attribute PROPNAME.

VALSTR
(Optional) String containing the value identifier of the PROPNAME element.

Back to top

DICTATION

Specifies the grammar node is a dictation grammar.

Attributes:

PROPNAME
(Optional) except if a VAL attribute is present.
The case-sensitive and possibly non-unique name of zero length whose XML replacement text (see XML attribute syntax above) is the semantic property name to be associated with recognition of this rule in the context of wherever this tag reference is present. Wherever this rule reference element is present, all property name/value pairs recognized by this rule will add PROPNAME to the front of the property name followed by a period.

VAL
Specifies the dictated text.

PROPID
(Optional) The identifier of the PROPNAME element.

MIN
(Optional) The default value for this is 1. The valid range of values for this is 0 to 255 and must be less than the value specified in MAX. **Note**: The value specified by MAX will be used when the specified MIN value is greater than the MAX value.

MAX
(Optional) The default value for this is 1. The valid range of values for this is 1 to 255, or indicated by "INF" in text.
This value indicates the maximum number of times valid recognitions of this element's contents may be recognized repeatedly. A value "INF" indicates that any number of recognitions may occur.

Back to top

RESOURCE

Specifies the grammar node is a resource grammar.

Attributes:

NAME
The text string containing the NAME and VALUE information associated with this resource.

Back to top

TEXTBUFFER

Specifies the grammar is from a null-terminated string.

Attributes:

PROPNAME
(Optional) except if a VAL attribute is present.

The case-sensitive and possibly non-unique name of zero length whose XML replacement text (see XML attribute syntax above) is the semantic property name to be associated with recognition of this rule in the context of wherever this tag reference is present. Wherever this rule reference element is present, all property name/value pairs recognized by this rule will add PROPNAME to the front of the property name followed by a period.

VAL
(Optional) Semantic value for the property specified by attribute PROPNAME.

PROPID
(Optional) The identifier of the TEXTBUFFER grammar element.

WEIGHT
Specifies the relative list position of the TEXTBUFFER grammar and is expressed as a float value.

Back to top

WILDCARD

Specifies a garbage word identifier for one or more non-silence sounds.

Attributes:

None

Back to top

[This is preliminary documentation and subject to change.]

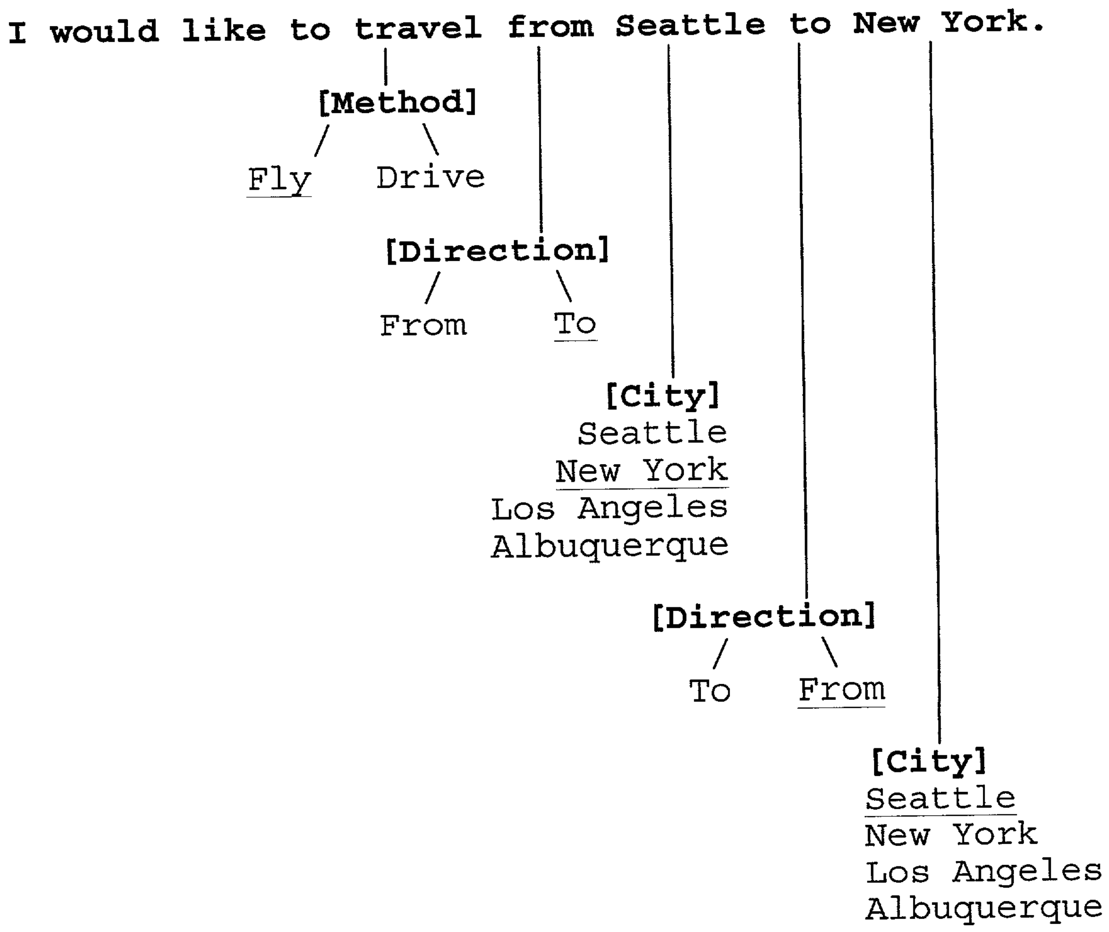
Grammar rules

Grammar rules are elements that SAPI 5.0 compliant recognition engines use to restrict the possible word or sentence choices during the speech recognition process. Recognition engines use grammar rules to control the elements of sentence construction by utilizing the predetermined list of recognized word or phrase choices. This list of recognized words or phrase choices contained in the grammar rules forms the basis of the recognition engine vocabulary.

The phrase or sentence uses each grammar rule element to determine the recognition path.

For example, examine the phrase describing travel plans, "I would like to travel from Seattle to New York," and note that there are elements that determine the resulting information. In this example, a person is planning to fly to New York from Seattle. This is a very simple illustration of what could be a very complex problem. Determining the same travel plans without limiting the method, direction, and travel destination would result in an infinite number of travel options.

The resulting information can be determined by restricting the available choices for a given sentence. Through this method, the resulting information can be composed only from certain available choices, thus eliminating the possibility of an infinite number of travel plan combinations.



The elements of interest in the example phrase are as follows:

- Method of travel (fly or drive)
- Travel direction (from or to)
- The city of origin for the travel plan (from)
- The city of destination for the travel plan (to)

I would like to travel from Seattle to New York.

Grammar rules become concatenated phrase elements. These phrase elements are limited to the defined set of grammars. Control can be significantly improved over the resulting information by restricting the input choice to a limited set of possibilities. Otherwise, obtaining the travel plan information from the same sample phrase, "I would like to travel from Seattle to New York," would be considerably more ambiguous.

The complexity of parsing the same sentence increases exponentially without using a defined set of choices. Imagine the possible number of combination in a sentence that is not restricted to a finite list of combinations. For example, examine the possible choice combinations by moving the mouse over the following sentence.

To display the available choice selections in the example phrase, move the mouse over the underlined text below:

"I want to—(unknown travel method)—(unknown travel direction)—(unknown city)—(unknown travel direction) (unknown city)." The amount of predictable information is significantly reduced without the ability to constrain the available choices within a sentence.

Grammar rules apply to the following:

TOPLEVEL
A grammar tagged as TOPLEVEL can be in an active or inactive state. The rules that import a grammar can override the activation state of a rule. This conditional state can be configured dynamically at runtime. If an inactive grammar is included in another grammar or grammar rule, ignore the inactive state. When a rule is activated, a speech recognition engine will accept only speech satisfying at least one of the active rules contained in the loaded grammar.

Non-terminal
A grammar node is considered to be non-terminal if it is the beginning of a choice selection or a group of choice selections. For example, the grammar node Dog is non-terminal when the subsequent choice selections are types of dogs. This type of grammar is defined as non-terminal because of its choice selections.

Terminal
A grammar node is considered to be terminal if it's the only word in the recognized vocabulary which can be spoken. Using the Dog example above, terminal grammar nodes are the type of dogs.

```
                   --------------------+
         Animal                        +--- Non-terminal
           |       --------------------+
           |
       /--+--\              -----------+
Cat--------/      \------Dog           +--- Non-terminal
 |                         |    -----------+
 |                         |
 |                         |    -----------+
 +-- Burmese               +-- Airedale    |
 +-- Himalayan             +-- Poodle      +--- Terminal nod
 +-- Persian               +-- Schnauzer   |
 +-- Siamese               +-- Whippet     |
                                -----------+
```

The text format grammar XML tags follow block scope methods that are similar to HTML tags. That is, each tag has an opening tag and a corresponding closing tag. There is more information about XML syntax in the Syntax and terminology section.

XML tag syntax	Contents
<sometag NAME="some_name" VAL="some_value">	Start of "sometag" tag scope which includes the name and value information.
</sometag>	End of the "sometag" scope.

⮝ Back to top

[This is preliminary documentation and subject to change.]

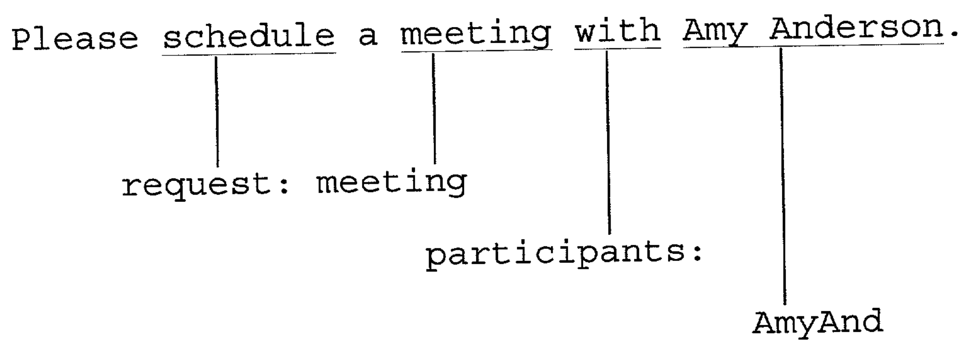
Designing grammar rules

Speech applications often use context-free grammars (CFG) to parse the recognizer output and in some instances, to act as the recognizer's language model. A speech recognition engine uses the CFG to constrain the words it will recognize that are contained in the user's utterance. If the CFG is augmented with semantic information (property names and property values as explained below), then a SAPI component converts the recognized word string into a name/value-meaning representation. The application then uses the meaning representation to control its part of the conversation with the user.

For example, the phrase "*Please schedule a meeting with Amy Anderson*" could be annotated as follows:

Phrase element	Grammar element	Conte
"schedule a meeting"	"request: meeting"	// attri
"with"	"participants:"	// only
"Amy Anderson"	"<email alias>"	// value

Defining the different grammar element components could result in the following:



The example sentence "Please schedule a meeting with Amy Anderson" generates the following SAPI 5.0 grammar:

```
<RULE TOPLEVEL=ACTIVE>
     <P PROPNAME="request" VAL="meeting">schedule a meet
```

```
        <P>with</P>
        <LN PROPNAME="participants">
            <PN VAL="AmyAnd">Amy Anderson</PN>
            <PN VAL="tbremer">Ted Bremer</PN>
            <PN VAL="fralee">Frank Lee</PN>
            <PN VAL="crandall">Cynthia Randall</PN>
            <PN VAL="swhite">Suki White</PN>
            <PN VAL="kyoshida">Kim Yoshida</PN>
        </LN>
    </RULE>
```

The result of saying the example sentence "Please schedule a meeting with Amy Anderson" would be as follows:

request:meeting

participants:AmyAnd

[This is preliminary documentation and subject to change.]

Using grammar rules

Grammar rules define sentence contents and phrase elements. Each grammar and grammar element determines the recognition engine's ability to effectively construct phrase elements. Phrases and sub-expressions are commonly represented by a separate rule and combined into larger phrases and sentences with higher level rules. For more information, see the Grammar rules section.

The following example illustrates how to implement a grammar for a game of solitaire.

```
<GRAMMAR LANGID="1033">
    <DEFINE>
        <ID NAME="FROM" VAL="1"/>
        <ID NAME="TO" VAL="2"/>
        <ID NAME="SUIT" VAL="3"/>
        <ID NAME="COLOR" VAL="4"/>
        <ID NAME="RANK" VAL="5"/>
        <ID NAME="ColorRed" VAL="11101"/>
        <ID NAME="ColorBlack" VAL="10011"/>
    </DEFINE>
   <RULE NAME="newgame" TOPLEVEL="ACTIVE">
      <P>new +game</P><O>-please</O>
   </RULE>
   <RULE NAME="playcard" TOPLEVEL="ACTIVE" EXPORT="1">
```

```
<RULE NAME="playcard" TOPLEVEL="ACTIVE" EXPORT="1">
   <O>please</O>
   <P>play the</P>
   <O>...</O>
   <RULEREF REF="card"/>
   <O>please</O>
</RULE>
<RULE NAME="movecard" TOPLEVEL="ACTIVE">
   <O>please</O>
   <P>
      <L>
         <P>move</P>
         <P>put</P>
      </L>
      <P>the</P>
   </P>
   <RULEREF PROPNAME="from" PROPID="FROM" NAME="card"/>
   <O>
      <L>
         <P>on</P>
         <P>to</P>
      </L>
      <P>the</P>
      <RULEREF PROPNAME="to" PROPID="TO" NAME="card"/>
   </O>
   <O>please</O>
</RULE>
<RULE NAME="card">
   <L>
      <P>
         <LN PROPNAME="color" PROPID="COLOR">
            <PN VAL="ColorRed">red</PN>
            <PN VAL="ColorBlack">black</PN>
         </LN>
         <RULEREF NAME="rank"/>
      </P>
      <P>
         <RULEREF NAME="rank"/>
         <O>
            <P>of</P>
            <LN PROPNAME="suit" PROPID="SUIT">
               <PN VAL="0">clubs</PN>
               <PN VAL="1">hearts</PN>
               <PN VAL="2">diamonds</PN>
               <PN VAL="3">spades</PN>
            </LN>
         </O>
      </P>
      <LN PROPNAME="suit" PROPID="SUIT">
         <PN VAL="0">club</PN>
```

```
            <PN VAL="1">heart</PN>
            <PN VAL="2">diamond</PN>
            <PN VAL="3">spade</PN>
         </LN>
      </L>
   </RULE>
   <RULE NAME="rank">
      <LN PROPNAME="rank" PROPID="RANK">
         <PN VAL="1">ace</PN>
         <PN VAL="2">two</PN>
         <PN VAL="3">three</PN>
         <PN VAL="4">four</PN>
         <PN VAL="5">five</PN>
         <PN VAL="6">six</PN>
         <PN VAL="7">seven</PN>
         <PN VAL="8">eight</PN>
         <PN VAL="9">nine</PN>
         <PN VAL="10">ten</PN>
         <PN VAL="11">jack</PN>
         <PN VAL="12">queen</PN>
         <PN VAL="13">king</PN>
         <PN VAL="12">lady</PN>
         <PN VAL="13">emperor</PN>
      </LN>
   </RULE>
</GRAMMAR>
```

Back to top

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpGrammarBuilder

Methods in Vtable Order

ISpGrammarBuilder Methods	**Description**
ResetGrammar	Resets all grammar rules and specifies an optional grammar.
GetRule	Retrieves grammar rule information.
ClearRule	Removes the state information associated with a grammar rule.
CreateNewState	Creates a new state in the same grammar rule.

AddWordTransition	Changes a phrase from the display form and adds each word individually to the grammar.
AddRuleTransition	
AddResource	
Commit	

[This is preliminary documentation and subject to change.]

Example application of ISpGrammarBuilder

The code example below illustrates an implementation of the ISpGrammarBuilder interface.

```
TPR t_ISpGrammarBuilder_ThankYouExample(ISpGrammarBuilder* pGrammarBuilder, LPCSTR
{
    // This test implement a small but compete example application using
    // ISpGrammarBuilder
    // THANKYOU ::= THANK (YOU)?
    // THANK ::= Thanks
    // THANK ::= Thank you (very much)?
    // YOU ::= Mary | Mike | Sam

    HRESULT hr = S_OK;
    int tpr = TPR_PASS;

    SPSTATEHANDLE hStateTHANK;       // the starting node of rule THANK
    SPSTATEHANDLE hStateThank1;
    SPSTATEHANDLE hStateThank2;
    SPSTATEHANDLE hStateThank3;
    SPSTATEHANDLE hStateYOU;         // the starting node of rule YOU
    SPSTATEHANDLE hStateTHANKYOU;    // the starting node of rule THANKYOU
    SPSTATEHANDLE hStateThankYou1;
    CSpCoTaskMemPtr<SPBINARYGRAMMAR> cpBinaryGrammar;

    // define rule THANK
    DOCHECKHREX(hr = pGrammarBuilder->GetRule(L"THANK", 1, 0, TRUE, &hStateTHANK);
    DOCHECKHREX(hr = pGrammarBuilder->CreateNewState(hStateTHANK, &hStateThank1);)
    DOCHECKHREX(hr = pGrammarBuilder->CreateNewState(hStateTHANK, &hStateThank2);)
    DOCHECKHREX(hr = pGrammarBuilder->CreateNewState(hStateTHANK, &hStateThank3);)
    // THANK ::= Thanks
    DOCHECKHREX(hr = pGrammarBuilder->AddWordTransition(hStateTHANK, NULL, L"Thank
    // THANK ::= Thank you (very much)?
    DOCHECKHREX(hr = pGrammarBuilder->AddWordTransition(hStateTHANK, hStateThank1,
    DOCHECKHREX(hr = pGrammarBuilder->AddWordTransition(hStateThank1, hStateThank2
    DOCHECKHREX(hr = pGrammarBuilder->AddWordTransition(hStateThank2, hStateThank3
    DOCHECKHREX(hr = pGrammarBuilder->AddWordTransition(hStateThank3, NULL, L"much
    DOCHECKHREX(hr = pGrammarBuilder->AddWordTransition(hStateThank2, NULL, NULL,

    // define rule YOU
    DOCHECKHREX(hr = pGrammarBuilder->GetRule(L"YOU", 2, 0, TRUE, &hStateYOU););
    // YOU ::= Mary | Mike | Sam
    // TODO: property?
    DOCHECKHREX(hr = pGrammarBuilder->AddWordTransition(hStateYOU, NULL, L"Mary",
    DOCHECKHREX(hr = pGrammarBuilder->AddWordTransition(hStateYOU, NULL, L"Mike",
    DOCHECKHREX(hr = pGrammarBuilder->AddWordTransition(hStateYOU, NULL, L"Sam", L

    // define rule THANKYOU
    DOCHECKHREX(hr = pGrammarBuilder->GetRule(L"THANKYOU", 3, SPRAF_TopLevel, TRUE
    DOCHECKHREX(hr = pGrammarBuilder->CreateNewState(hStateTHANKYOU, &hStateThankY
    // THANKYOU ::= THANK (YOU)?
    DOCHECKHREX(hr = pGrammarBuilder->AddRuleTransition(hStateTHANKYOU, hStateThan
    DOCHECKHREX(hr = pGrammarBuilder->AddRuleTransition(hStateThankYou1, NULL, hSt
    DOCHECKHREX(hr = pGrammarBuilder->AddWordTransition(hStateThankYou1, NULL, NUL

    // TODO: loop?

    hr = pGrammarBuilder->Commit(0);
    CheckHr(hr, tpr, "Example failed when Commit(0).");

  return tpr;
}
```

[This is preliminary documentation and subject to change.]

ISpGrammarBuilder::ResetGrammar

ISpGrammarBuilder::ResetGrammar resets all grammar rules and specifies an optional grammar.

```
HRESULT ResetGrammar(
   LANGID   NewLanguage
);
```

Parameters

NewLanguage
[in] Language identifier associated with the grammar rule.

Return values

Value	Description
S_OK	Function completed successfully.
FAILED(hr)	Appropriate error message.

Example

The following code snippet illustrates the use of ResetGrammar.

```
{
    HRESULT hr = S_OK;
    int tpr = TPR_PASS;

//=====================================================================
    TEST_TOPIC = "ResetGrammar when no rules";
//=====================================================================
    hr = pGrammarBuilder->ResetGrammar(1033);
    CheckHr(hr, tpr, TEST_TOPIC);

//=====================================================================
    TEST_TOPIC = "Set language to default user language";
//=====================================================================
    hr = pGrammarBuilder->ResetGrammar(SpGetUserDefaultUILanguage());
    CheckHr(hr, tpr, TEST_TOPIC);
```

```
//==========================================================================
    TEST_TOPIC = "Set language to non-english";
//==========================================================================
    hr = pGrammarBuilder->ResetGrammar(MAKELANGID(LANG_CHINESE, SUBLANG_CHINESE_SI
    CheckHr(hr, tpr, TEST_TOPIC);
    hr = pGrammarBuilder->ResetGrammar(MAKELANGID(LANG_JAPANESE, SUBLANG_DEFAULT))
    CheckHr(hr, tpr, TEST_TOPIC);

    return tpr;
}
```

[This is preliminary documentation and subject to change.]

ISpGrammarBuilder::GetRule

ISpGrammarBuilder::GetRule retrieves grammar rule information.

```
HRESULT GetRule(
   const WCHAR    *pszRuleName,
   DWORD           dwRuleId,
   DWORD           dwAttributes,
   BOOL            fCreateIfNotExist,
   SPSTATEHANDLE  *phInitialState
);
```

Parameters

pszRuleName
[in] Address of the null-terminated string containing the grammar rule name. If NULL, no search is made for the name.

dwRuleId
[in] Grammar rule identifier. If zero, no search is made for the rule ID.

dwAttributes
[in] Grammar rule attributes.

fCreateIfNotExist
[in] Boolean indicating that the grammar rule is to be created if one does not currently exist. TRUE allows the creation; FALSE does not.

phInitialState
[out] The initial state of the rule. May be NULL.

Return values

Value	**Description**
S_OK	Function completed successfully.
E_INVALIDARG	At least *pszRuleName phInitialState* is invalid or bad. Alternately, *pszRuleName* is NULL or *dwRuleId* is zero.
E_OUTOFMEMORY	Not enough memory to complete operation.
SPERR_RULE_NOT_FOUND	No rule matching the specified criteria can be found.
SPERR_RULE_NAME_ID_CONFLICT	More than one rule with the same name and ID was found.
FAILED(hr)	Appropriate error message.

Example

The following code snippet illustrates the use of GetRule.

```
    HRESULT hr = S_OK;
    SPSTATEHANDLE hState;

//=========================================================================
    TEST_TOPIC = "Create a rule with id";
//=========================================================================
    hr = pGrammarBuilder->GetRule(L"rule1", 1, SPRAF_Dynamic, TRUE, &hState);
    //Check return value

//=========================================================================
    TEST_TOPIC = "Create a rule without id";
//=========================================================================
    hr = pGrammarBuilder->GetRule(L"rule2", 0, SPRAF_Dynamic, TRUE, &hState);
    //Check return value

//=========================================================================
    TEST_TOPIC = "Get an existing rule by id";
//=========================================================================
    hr = pGrammarBuilder->GetRule(L"rule1", 1, SPRAF_Dynamic, TRUE, &hState);
    //Check return value

//=========================================================================
    TEST_TOPIC = "Get an existing rule by name";
//=========================================================================
    hr = pGrammarBuilder->GetRule(L"rule1", 0, SPRAF_Dynamic, TRUE, &hState);
    //Check return value
```

[This is preliminary documentation and subject to change.]

ISpGrammarBuilder::ClearRule

ISpGrammarBuilder::ClearRule removes the state information associated with a grammar rule.

```
HRESULT ClearRule(
  SPSTATEHANDLE   hState
);
```

Parameters

hState

Return values

Value	Description
S_OK	Function completed successfully.
FAILED(hr)	Appropriate error message.

Example

The following code snippet illustrates the use of ClearRule.

```
{
    HRESULT hr = S_OK;
    int tpr = TPR_PASS;

    SPSTATEHANDLE hInit;
    SPSTATEHANDLE hState;
    DOCHECKHREX(hr = pGrammarBuilder->GetRule(L"rule1", 1, 0, TRUE, &hInit););

//=====================================================================
    TEST_TOPIC = "ClearRule using hInitState";
//=====================================================================
    DOCHECKHREX(hr = pGrammarBuilder->CreateNewState(hInit, &hState););
    DOCHECKHREX(hr = pGrammarBuilder->AddWordTransition(hInit, hState, L"word", NU
    hr = pGrammarBuilder->ClearRule(hInit);
    CheckHr(hr, tpr, TEST_TOPIC);
    hr = pGrammarBuilder->AddWordTransition(hInit, hState, L"word", NULL, SPWT_LEX
    CompareHr(hr, E_INVALIDARG, tpr, CatMsg(TEST_TOPIC, ": not really cleared."));

//=====================================================================
    TEST_TOPIC = "ClearRule using hState != hInit";
//=====================================================================
    DOCHECKHREX(hr = pGrammarBuilder->CreateNewState(hInit, &hState););
    DOCHECKHREX(hr = pGrammarBuilder->AddWordTransition(hInit, hState, L"word", NU
    hr = pGrammarBuilder->ClearRule(hState);
    CheckHr(hr, tpr, TEST_TOPIC);
    hr = pGrammarBuilder->AddWordTransition(hInit, hState, L"word", NULL, SPWT_LEX
    CompareHr(hr, E_INVALIDARG, tpr, CatMsg(TEST_TOPIC, ": not really cleared."));

    return tpr;
}
```

[This is preliminary documentation and subject to change.]

ISpGrammarBuilder::CreateNewState

ISpGrammarBuilder::CreateNewState creates a new state in the same grammar rule.

```
HRESULT CreateNewState(
   SPSTATEHANDLE   hState,
   SPSTATEHANDLE   *phState
);
```

Parameters

hState
    Handle to the grammar rule information.
phState
    Address of the handle containing the grammar rule state information.

Return values

Value **Description**

S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.
FAILED(hr)	Appropriate error message.

Example

The following code snippet illustrates the use of CreateNewState.

```
{
    HRESULT hr = S_OK;
    int tpr = TPR_PASS;

    SPSTATEHANDLE hInit;
    DOCHECKHREX(hr = pGrammarBuilder->GetRule(L"rule1", 1, 0, TRUE, &hInit););

//=========================================================================
    TEST_TOPIC = "CreateNewState using the hInitState";
//=========================================================================
    SPSTATEHANDLE hState;
    hr = pGrammarBuilder->CreateNewState(hInit, &hState);
    CheckHr(hr, tpr, TEST_TOPIC);

//=========================================================================
    TEST_TOPIC = "CreateNewState using hState != hInit";
//=========================================================================
    SPSTATEHANDLE hState2;
    hr = pGrammarBuilder->CreateNewState(hState, &hState2);
    CheckHr(hr, tpr, TEST_TOPIC);

  return tpr;
}
```

[This is preliminary documentation and subject to change.]

ISpGrammarBuilder::AddWordTransition

ISpGrammarBuilder::AddWordTransition changes a phrase from the display form and adds each word individually to the grammar. Inverse text normalization is preformed on he phrase before adding words to the grammar.

```
HRESULT AddWordTransition(
   SPSTATEHANDLE         hFromState,
   SPSTATEHANDLE         hToState,
   const WCHAR          *psz,
   const WCHAR          *pszSeperators,
   SPGRAMMARWORDTYPE     eWordType,
   float                 Weight,
   const SPPROPERTYINFO *pPropInfo
);
```

Parameters

hFromState
Handle of the "from" word transition state information.

Handle of the "from" word transition state information.

hToState
: Handle of the "to" word transition state information.

psz
: Address of a null-terminated string containing the transition information. If the value in *psz* is NULL, the contents of *psz* is an epsilon.

pszSeperators
: Address of a null-terminated string containing the transition word separation characters. *pszSeperators* points to a single word if this value is NULL, or else *pszSeperators* specifies the valid separator characters.

eWordType
: The SPGRAMMARWORDTYPE enumeration that specifies the grammar type. Currently, only valid SPWT_LEXICAL is supported.

Weight
: Value specifying the grammar rule weight information.

pPropInfo
: The SPPROPERTYINFO structure containing property name and value information that is associated with the grammar.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	At least one of *psz*, *pszSeparators*, or *pPropInfo* is invalid or bad. Alternately *eWordType* is a value other than SPWT_LEXICAL.
FAILED(hr)	Appropriate error message.

Example

The following code snippet illustrates the use of AddWordTransition.

```
{
    HRESULT hr = S_OK;

    SPSTATEHANDLE hStateHello;
    SPSTATEHANDLE hStateHello1;
    SPSTATEHANDLE hStateBye;
    SPSTATEHANDLE hStateBye1;

//=====================================================================
    TEST_TOPIC = "Add word transition from normal state to NULL state (end of rule
//=====================================================================
    // define a new rule whose initial state is hState

    if(s_fVerifyEmptyRule)
    {
        hr = pGrammarBuilder->Commit(0);
        //Check return value
    }

    // add a word transition from hStateHello to NULL
    hr = pGrammarBuilder->AddWordTransition(hStateHello, NULL, L"Hello", L" ", SPW
    //Check return value

    hr = pGrammarBuilder->Commit(0);
    //Check return value

//===================================================================
    TEST_TOPIC = "Add word transition from a 'fly' state which is not connected to
//===================================================================
    SPSTATEHANDLE hStateFly;

    hr = pGrammarBuilder->AddWordTransition(hStateFly, NULL, L"fly", NULL, SPWT_LE
    //Check return value

    if(s_fVerifyFlyState)
    {
        hr = pGrammarBuilder->Commit(0);
        //Check return value
    }

//===================================================================
    TEST_TOPIC = "Add word transition to non-NULL state";
//===================================================================
    if(s_fVerifyEmptyRule)
    {
        hr = pGrammarBuilder->Commit(0);
        //Check return value
    }

    // add word transitions from hStateBye to hStateBye1 then to NULL
    hr = pGrammarBuilder->AddWordTransition(hStateBye, hStateBye1, L"Good", L" ",
    //Check return value

    hr = pGrammarBuilder->AddWordTransition(hStateBye1, NULL, L"bye", L" ", SPWT_L
    //Check return value

    hr = pGrammarBuilder->Commit(0);
    CheckHr(hr, tpr, CatMsg(TEST_TOPIC, ": Commit(0)"));

//===================================================================
    TEST_TOPIC = "Add additional word transition to a node";
//===================================================================
    hr = pGrammarBuilder->AddWordTransition(hStateHello, NULL, L"Hi", L" ", SPWT_L
    //Check return value

    hr = pGrammarBuilder->Commit(0);
    //Check return value

//===================================================================
    TEST_TOPIC = "Add duplicate word transition to a different node";
//===================================================================
    // add duplicate word transition from hStateHello to newNode
    hr = pGrammarBuilder->AddWordTransition(hStateHello, hStateHello1, L"Hi", L" "
    //Check return value

    hr = pGrammarBuilder->Commit(0);
    //Check return value

    // now finish this rule
    hr = pGrammarBuilder->AddWordTransition(hStateHello1, NULL, L"there", L" ", SP
    //Check return value

    hr = pGrammarBuilder->Commit(0);
    //Check return value

//===================================================================
    TEST_TOPIC = "Add duplicate word transition to the same NULL node";
//===================================================================
    hr = pGrammarBuilder->AddWordTransition(hStateHello, NULL, L"Hi", L" ", SPWT_L
    //Check return value

//==================================================================
    TEST_TOPIC = "Add duplicate word transition to the same non-NULL node";
//==================================================================
    hr = pGrammarBuilder->AddWordTransition(hStateHello, hStateHello1, L"Hi", L" "
    //Check return value
```

[This is preliminary documentation and subject to change.]

ISpGrammarBuilder::AddRuleTransition

```
HRESULT AddRuleTransition(
   SPSTATEHANDLE          hFromState,
   SPSTATEHANDLE          hToState,
   SPSTATEHANDLE          hRule,
   float                  Weight,
   const SPPROPERTYINFO   *pPropInfo
);
```

Parameters

hFromState
  Handle of the "from" rule transition state information.
hToState
  Handle of the "to" rule transition state information.
hRule
  Handle of the grammar rule's initial state.
Weight
  Value specifying the grammar rule weight information.
pPropInfo
  The SPPROPERTYINFO structure containing property name and value information associated with the grammar.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	The grammar nodes rule state are the not the same.
E_OUTOFMEMORY	Not enough memory to complete operation.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpGrammarBuilder::AddResource

ISpGrammarBuilder::AddResource

```
HRESULT AddResource(
   SPSTATEHANDLE   hRuleState,
   const WCHAR    *pszResourceName,
   const WCHAR    *pszResourceValue
);
```

Parameters

hRuleState
[in] Handle of the rule state information.
pszResourceName
[in] Address of a null-terminated string specifying the resource name information.
pszResourceValue
[in] Address of a null-terminated string specifying the resource value information.

Return values

Value	Description
S_OK	Function completed successfully.
FAILED(hr)	Appropriate error message.

Example

The following code snippet illustrates the use of AddResource.

```
{
    HRESULT hr = S_OK;
    int tpr = TPR_PASS;

    SPSTATEHANDLE hInit;
    DOCHECKHREX(hr = pGrammarBuilder->GetRule(L"rule1", 1, 0, TRUE, &hInit););
    SPSTATEHANDLE hState;
    DOCHECKHREX(hr = pGrammarBuilder->CreateNewState(hInit, &hState););

//=====================================================================
    TEST_TOPIC = "AddResource using the hInitState";
//=====================================================================
    hr = pGrammarBuilder->AddResource(hInit, L"ResName1", L"ResValue1");
    CheckHr(hr, tpr, TEST_TOPIC);

//=====================================================================
    TEST_TOPIC = "AddResource using hState != hInit";
//=====================================================================
    hr = pGrammarBuilder->AddResource(hState, L"ResName2", L"ResValue2");
    CheckHr(hr, tpr, TEST_TOPIC);

  return tpr;
}
```

[This is preliminary documentation and subject to change.]

ISpGrammarBuilder::Commit

ISpGrammarBuilder::Commit

ISpGrammarBuilder::Commit

```
HRESULT Commit(
   DWORD   dwReserved
);
```

Parameters

dwReserved
Reserved.

Return values

Value	Description
S_OK	Function completed successfully.
FAILED(hr)	Appropriate error message.

Example

The following code snippet illustrates the use of Commit.

```
{
    HRESULT hr = S_OK;
    int tpr = TPR_PASS;

//=======================================================================
    TEST_TOPIC = "Commit when there are no rules";
//=======================================================================
    hr = pGrammarBuilder->Commit(0);
    CompareHr(hr, SPERR_NO_RULES, tpr, TEST_TOPIC);

    // not add some rules
    DOCHECKHREX(hr = pGrammarBuilder->GetRule(L"rule1", 1, SPRAF_Dynamic, TRUE, NU
    SPSTATEHANDLE hState;
    DOCHECKHREX(hr = pGrammarBuilder->GetRule(L"rule2", 2, 0, TRUE, &hState););
    DOCHECKHREX(hr = pGrammarBuilder->AddWordTransition(hState, NULL, L"test", L"

//=======================================================================
    TEST_TOPIC = "Commit normally";
//=======================================================================
    {
        hr = pGrammarBuilder->Commit(0);
        CheckHr(hr, tpr, TEST_TOPIC);
    }

  return tpr;
}
```

Related topics

[This is preliminary documentation and subject to change.]

Lexicon Manager

The following section covers:

- ISpContainerLexicon
- ISpLexicon
- ISpPhoneConverter

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpContainerLexicon

ISpContainerLexicon inherits from ISpLexicon.

Methods in Vtable Order

ISpContainerLexicon Methods	**Description**
AddLexicon	Adds a lexicon and its type to the lexicon stack.

[This is preliminary documentation and subject to change.]

ISpContainerLexicon::AddLexicon

ISpContainerLexicon::AddLexicon adds a lexicon and its type to the lexicon stack.

```
HRESULT AddLexicon(
   ISpLexicon   *pAddLexicon,
   DWORD         dwFlags
);
```

Parameters

pAddLexicon
  [in] Pointer to the lexicon interface.
dwFlags
  [in] flags of type SPLEXICONTYPE indicating the lexicon type.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*dwFlag* is invalid or bad.
E_POINTER	*pLexicon* is invalid or bad.
E_OUTOFMEMORY	Exceeded available memory.
FAILED(hr)	Appropriate error message.

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpLexicon

The Lexicon database is a repository of words and word-related information such as pronunciations and parts of speech. The SAPI lexicon interface provides application CSR and TTS engine developers a standard method with which to create, access, modify, and synchronize with lexicons.

There are two types of custom lexicons supported by lexicon interface: user and application. The user lexicon stores words specific to a user. It is a read/write lexicon and is shared among all applications. The application lexicon is supplied by the application and stores words specific to the application. The application supplied lexicons are read-only. Application lexicons ensure that the vocabulary used by the application is well represented in the lexicon.

Application lexicons are built with an application lexicon compiler shipped with the SDK (not shipped in beta release). The lexicon interface provides methods to synchronize changes in lexicons using a lexicon generation ID. These changes in the lexicon are a result of modifications to user lexicons or for the installation or uninstallation of application lexicons. Clients can use the synchronization to update their private stores with the changes made to the custom lexicons while the client has been offline. For example, SR engines can update their language models with changes made to the custom lexicons while the SR engine had been off-line.

Note: Application lexicons cannot be added in the runtime environment.
When an application wants to add a lexicon, the application must either:

1. Create and add a private lexicon.
2. Register the lexicon, close the container lexicon and restart it.

Apart from custom lexicons, the lexicon interface provides access to vendor, morph, and letter-to-sound lexicons that Microsoft ships with SAPI. Vendor lexicons are large vocabulary lexicons holding words and their pronunciations and parts of speech. The morph lexicons derive pronunciations using the data in the vendor lexicon. The letter-to-sound lexicon computes the pronunciation of a word from its spelling.

Methods in Vtable Order

ISpLexicon Methods	Description

GetPronunciations	Gets pronunciations and parts of speech for a word.
AddPronunciation	Adds pronunciations and parts of speech to a word.
RemovePronunciation	Removes the word and its pronunciations and the parts of speech from the user lexicon.
GetGeneration	Passes back the generation ID for a word.
GetGenerationChange	Gets a list of words which have changed between the current and a specified generation.
GetWords	Gets all words for the user and/or application lexicons.

[This is preliminary documentation and subject to change.]

ISpLexicon::GetPronunciations

ISpLexicon::GetPronunciations gets pronunciations and parts of speech for a word.

```
HRESULT GetPronunciations(
   const WCHAR               *pszWord,
   LANGID                     LangID,
   DWORD                      dwFlags,
   SPWORDPRONUNCIATIONLIST   *pWordPronunciationList
);
```

Parameters

pszWord
[in] Pointer to a text string as a search keyword. Length must be equal to less than SP_MAX_WORD_LENGTH.

LangID
[in] The language ID of the word. May be zero to indicate that the word can be of any LANGID.

dwFlags
[in] Bitwise flags of type SPLEXICONTYPE indicating that the lexicons searched for this word.

pWordPronunciationList
[in, out] Pointer to SPWORDPRONUNCIATIONLIST structure in which the pronunciations and parts of speech are returned.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	Either *pszWord* and/or *pWordPronunciationList* is NULL.
E_INVALIDARG	Either *pszWord* and/or *pWordPronunciationList* is invalid or bad.
E_OUTOFMEMORY	Exceeded available memory.
SPERR_UNINITIALIZED	Interface not allocated.

SPERR_NOT_IN_LEX	Word is not found in the lexicon.
SP_WORD_EXISTS_WITHOUT_PRONUNCIATION	The word exists but does not have a pronunciation.
FAILED(hr)	Appropriate error message.

Example

The following example is a code fragment demonstrating the use of GetPronunciations.

```
SPWORDPRONUNCIATIONLIST spwordpronlist;
memset(&spwordpronlist, 0, sizeof(spwordpronlist));

hr = pISpLexicon->GetPronunciations(L"resume", 1033, eLEXTYE_ALL, &spwordp
//test for results
if( !SUCCEDED(hr)) return;

for (
     SPWORDPRONUNCIATION pwordpron = pwordpronlist->pFirstWordPron;
     wordpron != NULL;
     wordpron = pwordpron->pNextWordPron
       )
{
    DoSomethingWith(pwordpron->ePartOfSpeech, pwordpron->szPronunciation);
}

//free all the buffers
CoTaskMemFree(spwordpronlist.pvBuffer);
```

[This is preliminary documentation and subject to change.]

ISpLexicon::AddPronunciation

ISpLexicon::AddPronunciation adds word pronunciations and parts of speech (POS) to the user lexicon. SAPI will not modify the word if spelling, pronunciation, and POS are the same as the existing entry.

```
HRESULT AddPronunciation(
   const WCHAR       *pszWord,
   LANGID             LangID,
   SPPARTOFSPEECH     ePartOfSpeech,
   const WCHAR       *pszPronunciation
);
```

Parameters

pszWord
    [in] The word to add.
LangID
    [in] The language ID of the word. The speech user default will be used if LANGID is omitted. Length must be equal to or less than SP_MAX_WORD_LENGTH.
ePartOfSpeech
    [in] The part of speech of type SPPARTOFSPEECH.
pszPronunciation
    [in] Null-terminated pronunciation of the word in the NUM phone set. Multiple pronunciations

[in] Null-terminated pronunciation of the word in the NUM phone set. Multiple pronunciations may be appended to a single word by assigning a new POS. The length must be equal to or less than SP_MAX_PRON_LENGTH.

Return values

Value	**Description**
S_OK	Function completed successfully.
E_POINTER	Pointer to the word is invalid.
E_INVALIDARG	At least one of the parameters are invalid or bad.
SP_ALREADY_IN_LEX	Word has already been added to the lexicon.
SPERR_APPLEX_READ_ONLY	Word is read only and cannot be removed.
SPERR_UNINITIALIZED	The interface has not been initialized.
E_OUTOFMEMORY	Exceeded available memory.
FAILED(hr)	Appropriate error message.

Example

The following is an example of AddPronunciation.

```
WCHAR wszNum[3];
wszNum[0] = 0x000b;
wszNum[1] = 0x0012;
wszNum[2] = 0;

pISpLexicon->AddPronunciation(L"Rob", 0x409, SPPS_NOUN, szNum);
```

[This is preliminary documentation and subject to change.]

ISpLexicon::RemovePronunciation

ISpLexicon::RemovePronunciation removes the word, its pronunciations and the part of speech (POS) from the user lexicon.

```
HRESULT RemovePronunciation(
   const WCHAR      *pszWord,
   LANGID            LangID,
   SPPARTOFSPEECH    ePartOfSpeech,
   const WCHAR      *pszPronunciation
);
```

Parameters

pszWord
[in] The word to remove.
LangID
[in] The language ID of the word. The speech user default will be used if LANGID is omitted.
ePartOfSpeech

[in] The part of speech of type SPPARTOFSPEECH.

pszPronunciation

[in] Pronunciation of the word. If the pronunciation is non-NULL, then delete only this pronunciation and its associated part of speech. If there is only one pronunciation, then delete the word. If the pronunciation is NULL, then delete the word and all of its pronunciations and parts of speech.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	Pointer to the word is invalid.
E_INVALIDARG	One of the parameters is not valid.
E_OUTOFMEMORY	Exceeded available memory.
SPERR_NOT_IN_LEX	Word is not found in the lexicon.
SPERR_APPLEX_READ_ONLY	Word is read only and can not be removed.
SPERR_UNINITIALIZED	Interface not initialized.
FAILED(hr)	Appropriate error message.

Example

The following code fragment is an example of RemovePronunciation.

```
WCHAR szPronounce[MAX_PRON_LEN];
DWORD d;
VOICEPARTOFSPEECH POS;

HRESULT hr = Get((VOICECHARSET)0, pszText, wSense, szPronounce, MAX_PRON_L
if (SUCCEEDED(hr))
      hr = m_pLex->RemovePronunciation(pszText, 1033, (SPPARTOFSPEECH)POS
```

[This is preliminary documentation and subject to change.]

ISpLexicon::GetGeneration

ISpLexicon::GetGeneration passes back the generation ID for a word.

Each change (either as an install or uninstall) in the user lexicon will increment the generation ID by one.

```
HRESULT GetGeneration(
   DWORD   *pdwGeneration
);
```

Parameters

pdwGeneration

pdwGeneration
: The generation ID. This is a relative count of how many times the custom lexicons have changed.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	Generation value is zero or undefined.
E_INVALIDARG	Generation value is invalid.
SPERR_UNINITIALIZED	Interface is not initialized.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpLexicon::GetGenerationChange

ISpLexicon::GetGenerationChange passes back a list of words which has changed between a given generation and current generation.

```
HRESULT GetGenerationChange(
   DWORD          dwFlags,
   DWORD         *pdwGeneration,
   SPWORDLIST    *pWordList
);
```

Parameters

dwFlags
: [in] The lexicon category of type SPLEXICONTYPE. Currently it must be eLEXTYPE_USER or eLEXTYPE_APP.

pdwGeneration
: [in, out] The generation ID of client when passed in. The current generation ID is passed back on successful completion of the call.

pWordList
: [in, out] The buffer containing the word list and its related information.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	*pdwGeneration* is zero or NULL.
E_INVALIDARG	*pdwGeneration* is invalid or bad.
SPERR_UNINITIALIZED	Interface has not been initialized.
E_OUTOFMEMORY	Exceeded available memory.
SP_LEX_NOTHING_TO_SYNC	No words are available with which to synchronize.

SP_LEX_NOTHING_TO_SYNC	No words are available with which to synchronize.
SPERR_APPLEX_READ_ONLY	Word is read only and cannot be removed.
SPERR_LEX_VERY_OUT_OF_SYNC	The value passed in with *pdwGeneration* is greater than the custom lexicon's generation ID. Use ISpLexicon::GetWords if GetGenerationChange returns SPERR_LEX_VERY_OUT_OF_SYNC to regenerate an entire list of words based on the current generation.
FAILED(hr)	Appropriate error message.

Example

The following is an example of GetGenerationChange.

```
MainSRLoop:

  for (;;)
  {
    hr = pISpLexicon->GetGenerationChange(eLEXTYPE_USER, &m_dwGeneration, &spwordl

    // If, for example, a new application lexicon was added, we'll have
    // to rebuild from scratch.
    if (hr == SPERR_LEX_VERY_OUT_OF_SYNC)
        Rebuild(); // Call GetWords

    // Some other error
    if (FAILED(hr)
        DealWithOtherErrors();

    // Loop thru the changed words, and their new pronunciations
        for (SPWORD *pword = spwordlist.pFirstWord;
             pword != NULL;
             pword = pword->pNextWord)
       {
           for (SPWORDPRON pwordpron = pword->pFirstWordPron;
             pwordpron != NULL;
             pwordpron = pwordpron->pNextWordPron)
            {
               AddPronunciationToEngineDataStructures(
               pword->pszWord,
               pwordpron->ePartOfSpeech,
               pwordpron->pszPronIPA);
            }
       }
  }

// Continue with SR code...
```

[This is preliminary documentation and subject to change.]

ISpLexicon::GetWords

ISpLexicon::GetWords gets all words for the container lexicons.

This method is called repeatedly with the cookie (set to zero the first time) until S_OK is returned. S_FALSE is returned indicating additional information is left.

```
HRESULT GetWords(
   DWORD          dwFlags,
   DWORD         *pdwGeneration,
   DWORD         *pdwCookie,
   SPWORDLIST    *pWordList
);
```

Parameters

dwFlags
[in] Bitwise flags of type SPLEXICONTYPE from which words are to be retrieved. Valid values are eLEXTYPE_USER and eLEXTYPE_APP.

pdwGeneration
[out] The current generation ID of the custom lexicon.

pdwCookie
[in, out] Cookie passed back by this call. It should subsequently be passed back in to get more data. If the call returns S_FAILED, then data is remaining and GetWords should be called again. The initial value of the cookie passed in must be zero or *pdwCookie* be a NULL pointer. NULL indicates the method should return all words contained in the lexicon. If it cannot SP_LEX_REQUIRES_COOKIE is returned instead.

pWordList
[in, out] The buffer containing the word list and its related information.

Return values

Value	Description
S_OK	Function completed successfully. In addition, the value of *pdwCookie* did not change.
S_FALSE	Additional words are left in the lexicon(s) to process. The value of *pdwCookie* did change.
E_POINTER	At least one of *pdwGeneration*, *pdwCookie*, *pWordList* is zero or NULL.
E_INVALIDARG	One of the parameters is not valid.
E_OUTOFMEMORY	Exceeded available memory.
SPERR_UNINITIALIZED	Interface not initialized.
SP_LEX_NOTHING_TO_SYNC	No words are available with which to synchronize.
SP_LEX_REQUIRES_COOKIE	A complete list of words cannot be returned from the container lexicon. *pdwCookie* must not be NULL.
FAILED(hr)	Appropriate error message.

Example

The following is an example of using GetWords.

```
SPWORDLIST spwordlist;
memset(&spwordlist, 0, sizeof(spwordlist));
dwCookie = 0;

  while (SUCCEEDED(hr = pISpLexicon->GetWords(eLEXTYPE_USER | eLEXTYPE_APP, &dwG
   {
       for (SPWORD *pword = spwordlist.pFirstWord;
            pword != NULL;
            pword = pword->pNextWord)
       {
        {
          for (SPWORDPRONUNCIATION *pwordpron = pword->pFirstWordPronunciation;
               pwordpron != NULL;
               pwordpron = pwordpron->pNextWordPronunciation)
             {
               DoSomethingWith(pwordpron->ePartOfSpeech, pwordpron->pszPronIPA);
             }
         }

       if (hr == S_OK)
              break;  // nothing more to retrieve
    }

   //free all the buffers
   CoTaskMemFree(spwordlist.pvBuffer);

   // Check for SUCCEEDED(hr);
```

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpPhoneConverter

The ISpPhoneConverter interface enables the client to convert from the SAPI character phoneset to the Id phoneset.

When to Use

Call methods of the ISpPhoneConverter interface to convert between character and NUM phonesets.

Note: ISpPhoneConverter inherits from ISpObjectWithToken.

Methods in Vtable Order

ISpPhoneConverter Methods	Description
PhoneToId	Converts an internal phone string to Id code string.
IdToPhone	Converts an Id code string to internal phone.

[This is preliminary documentation and subject to change.]

ISpPhoneConverter::PhoneToId

ISpPhoneConverter::PhoneToId converts an internal phone string to Id code string.

The internal phones are space separated and may have a space at the end.

```
HRESULT PhoneToId(
   const WCHAR  *pszPhone,
   SPPHONEID    *pId
);
```

Parameters

pszPhone
: [in] Address of a null-terminated string that contains the phone string information.

pId
: [out] Address of the SPPHONEID that receives the phone identifier.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpPhoneConverter::IdToPhone

ISpPhoneConverter::IdToPhone converts an Id code string to internal phone.

The output internal phones are space separated.

```
HRESULT IdToPhone(
   const SPPHONEID   *pId,
   WCHAR             *pszPhone
);
```

Parameters

pId
: [in] Address of the SPPHONEID that contains the phone identifier.

pszPhone
: [out] Address of a null-terminated string that receives the phone string information.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.
E_POINTER	Invalid pointer.

FAILED(hr)	Appropriate error message.

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

Resource Manager

The following section covers:

- ISpDataKey
- ISpRegDataKey
- ISpObjectTokenInit
- ISpObjectTokenCategory
- ISpObjectToken
- IEnumSpObjectTokens
- ISpObjectWithToken
- ISpResourceManager
- ISpTask

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpDataKey

The ISpDataKey interface is used to access the speech object registry functions.

When to Implement

Implement this interface when a caller wants to have access and the ability to modify the registry information for a given speech object.

Methods in Vtable Order

ISpDataKey Methods	Description
SetData	Sets the value information for a specified registry key.
GetData	Retrieves a value information from a specified registry key.
SetStringValue	Sets the string value information for a specified registry key.
GetStringValue	Retrieves the string value information from a specified registry key.
SetDWORD	Sets the value information for a specified registry key.

GetDWORD	Retrieves the value information from a specified registry key.
OpenKey	Opens a specified registry key.
CreateKey	Creates a new registry key.
DeleteKey	Deletes a specified registry key and all its descendants.
DeleteValue	Deletes a named value from the specified registry key.
EnumKeys	Enumerates the subkeys of the specified open registry key.
EnumValues	Enumerates the values of the specified open registry key.

[This is preliminary documentation and subject to change.]

ISpDataKey::SetData

ISpDataKey::SetData sets the value information for a specified registry key.

```
HRESULT SetData(
   const WCHAR   *pszValueName,
   ULONG          cbData,
   const BYTE    *pData
);
```

Parameters

pszValueName
: [in] Address of a null-terminated string that contains the registry key value name.

cbData
: [in] Size of the destination data buffer that contains the registry key value information.

pData
: [out] Address of the destination data buffer that contains the registry key value information.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	Either *pszValueName* or *pData* is an invalid or bad pointer.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpDataKey::GetData

ISpDataKey::GetData

ISpDataKey::GetData retrieves the value information from a specified registry key.

```
HRESULT GetData(
   const WCHAR    *pszValueName,
   ULONG          *pcbData,
   BYTE           *pData
);
```

Parameters

pszValueName
: Address of a null-terminated string containing the name of the registry key from which to retrieve the registry key value.

pcbData
: Address of the size of the destination data buffer that receives the registry key value information.

pData
: Address of the destination data buffer that receives the registry key value information.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*pszValueName* is invalid or bad.
E_POINTER	Either *pcbData* or *pData* is an invalid or bad pointer.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpDataKey::SetStringValue

ISpDataKey::SetStringValue writes the string value information for a specified registry key.

```
HRESULT SetStringValue(
   const WCHAR   *pszValueName,
   const WCHAR   *pszValue
);
```

Parameters

pszValueName
: Address of the null-terminated string that specifies the name of the string value. If NULL, the default value of the registry key is used.

pszValue
: Address of a null-terminated string that contains the string value to be set for the specified key.

Address of a null-terminated string that contains the string value to be set for the specified key.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	Either *pszValueName* or *pszValue* is invalid or bad.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpDataKey::GetStringValue

ISpDataKey::GetStringValue reads the string value information from a specified registry key.

```
HRESULT GetStringValue(
   const WCHAR   *pszValueName,
   WCHAR        **ppszValue
);
```

Parameters

pszValueName
Address of a null-terminated string that specifies the name of the registry key. If NULL, the default value of the registry key is read.

ppszValue
Address of a pointer to a null-terminated string that receives the string value for the specified key.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*pszValueName* is invalid or bad.
E_POINTER	*ppszValue* is invalid or bad.
SPERR_NOT_FOUND	Registry file not found.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpDataKey::SetDWORD

ISpDataKey::SetDWORD sets the specified DWORD to the registry.

```
HRESULT SetDWORD(
   const WCHAR   *pszValueName,
   DWORD          dwValue
);
```

Parameters

pszValueName
   Address of a null-terminated string that contains the registry key value name.
dwValue
   Address of the destination data buffer that contains the registry key value information.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*pszValueName* is invalid or bad.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpDataKey::GetDWORD

ISpDataKey::GetDWORD reads the specified DWORD from the registry.

```
HRESULT GetDWORD(
   const WCHAR   *pszValueName,
   DWORD         *pdwValue
);
```

Parameters

pszValueName
   [in] Address of a null-terminated string containing the name of the registry key from which to retrieve the registry key value.
pdwValue
   [out] Address of the destination data buffer that receives the registry key value information.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*pszValueName* is invalid or bad.

E_POINTER	*pdwValue* is invalid or bad.
SPERR_NOT_FOUND	Registry key not found.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpDataKey::OpenKey

ISpDataKey::OpenKey opens a subkey and passes back a new object that supports ISpDataKey for the specified subkey.

```
HRESULT OpenKey(
   const WCHAR   *pszSubKeyName,
   ISpDataKey   **ppSubKey
);
```

Parameters

pszSubKeyName
Address of a null-terminated string specifying the name of the key to open.
ppSubKey
Address of a pointer to an ISpDataKey interface. dl

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*pszSubKeyName* is invalid or bad.
E_POINTER	*ppSubKey* is invalid or bad.
SPERR_NOT_FOUND	Registry key not found.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpDataKey::CreateKey

ISpDataKey::CreateKey creates a sub-key and returns a new object which supports ISpDataKey for the specified sub-key.

```
HRESULT CreateKey(
   const WCHAR   *pszSubKey,
  ISpDataKey   **ppSubKey
);
```

Parameters

pszSubKey
: Address of a null-terminated string specifying the name of the key to create.

ppSubKey
: Address of a pointer to an ISpDataKey interface.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	Either *pszSubKeyName* or *ppSubKey* is invalid or bad.
FAILED(hr)	Appropriate error message.

ISpDataKey::DeleteKey

ISpDataKey::DeleteKey deletes a specified registry key and all its descendants.

The function will remove the key and all of the key's values from the registry.

```
HRESULT DeleteKey(
  const WCHAR   *pszSubKey
);
```

Parameters

pszSubKey
: Address of a null-terminated string specifying the name of the key to delete.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*pszSubKeyName* is invalid or bad.
FAILED(hr)	Appropriate error message.

ISpDataKey::DeleteValue

ISpDataKey::DeleteValue deletes a named value from the specified registry key.

```
HRESULT DeleteValue(
   const WCHAR   *pszValueName
);
```

Parameters

pszValueName
  Address of a null-terminated string specifying the value to be deleted.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*pszValueName* is invalid or bad.
SPERR_NOT_FOUND	Registry key not found.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpDataKey::EnumKeys

ISpDataKey::EnumKeys enumerates the subkeys of the specified open registry key using the index.

```
HRESULT EnumKeys(
   ULONG      Index,
   WCHAR    **ppszKeyName
);
```

Parameters

Index
  [in] Index of the subkey to retrieve. This parameter should be zero for the first call and incremented for subsequent calls.

ppszKeyName

ppszKeyName
[out] Address of a pointer to a null-terminated string that receives the enumerated key name. This must be freed with CoMemTaskFree() when no longer required.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*ppszKeyName* is invalid or bad.
SPERR_NOT_FOUND	Registry key not found.
E_OUTOFMEMORY	Not enough memory to allocate string.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpDataKey::EnumValues

ISpDataKey::EnumValues enumerates the values of the specified open registry key.

```
HRESULT EnumValues(
   ULONG     Index,
   WCHAR    **ppszValueName
);
```

Parameters

Index
Index of the subkey to retrieve. This parameter should be zero for the first call and incremented for subsequent calls.

ppszValueName
Address of a pointer to a null-terminated string that receives the enumerated registry key values. This must be freed with CoMemTaskFree() when no longer required.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*ppszValueName* is invalid or bad.
SPERR_NOT_FOUND	Registry key not found.
E_OUTOFMEMORY	Not enough memory to allocate string.
FAILED(hr)	Appropriate error message.

Microsoft Speech SDK

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpRegDataKey

The ISpRegDataKey inherits from ISpDataKey.

Methods in Vtable Order

ISpRegDataKey Methods	Description
SetKey	Sets the hive registry key (HKEY) to use for subsequent token operations.

[This is preliminary documentation and subject to change.]

ISpRegDataKey::SetKey

ISpRegDataKey::SetKey sets the hive registry key (HKEY) to use for subsequent token operations.

```
HRESULT SetKey(
   HKEY    hkey,
   BOOL    fReadOnly
);
```

Parameters

hkey
 [in] The registry key to use.
fReadOnly
 [in] Boolean flag setting the keys to read/write status. If TRUE, the registry is read only; FALSE sets it to read and write.

Return values

Value	Description
S_OK	Function completed successfully.
SPERR_ALREADY_INITIALIZED	Interface is already initialized.

Example

The following code snippet adds, tests and deletes a superfluous key from the speech registry.

```
HRESULT hr;

CComPtr cpSpRegDataKey;
CComPtr cpSpCreatedDataKey;
CComPtr cpSpCategory;
CComPtr cpSpDataKey;
HKEY hkey;

//create a bogus key under Voices
hr = g_Unicode.RegCreateKeyEx(HKEY_LOCAL_MACHINE,
        L"SOFTWARE\\Microsoft\\Speech\\Voices\\bogus",
        0, NULL, 0, KEY_READ | KEY_WRITE, NULL, &hkey, NULL);
//Check error

hr = cpSpRegDataKey.CoCreateInstance(CLSID_SpDataKey);
//Check error

hr = cpSpRegDataKey->SetKey(hkey, false);
//Check error

hkey = NULL;
hr = cpSpRegDataKey->QueryInterface(&cpSpCreatedDataKey);
//Check error

//delete this bogus key
hr = SpGetCategoryFromId(SPCAT_VOICES, &cpSpCategory);
//Check error

hr = cpSpCategory->GetDataKey(SPDKL_LocalMachine, &cpSpDataKey);
//Check error

hr = cpSpDataKey->DeleteKey(L"bogus");
//Check error
```

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpObjectTokenInit

This interface inherits from ISpObjectToken.

Methods in Vtable Order

ISpObjectTokenInit Methods	Description
InitFromDataKey	Initializes a token to use a specified datakey.

[This is preliminary documentation and subject to change.]

ISpObjectTokenInit::InitFromDataKey

ISpObjectTokenInit::SetObjectToken initializes a token to use a specified datakey.

Dynamic token enumerators can use this to create tokens under their token enumerator's token. Once created, this enables ISpDataKey::CreateKey to make a new data key, create a new object token, and then use InitFromDataKey.

```
HRESULT InitFromDataKey(
   const WCHAR   *pszCategoryId,
   const WCHAR   *pszTokenId,
   ISpDataKey    *pDataKey
);
```

Parameters

pszCategoryId
[in] Address of an ISpDataKey interface that specifies the system registry key from which to create the token.
pszTokenId
[in] The null-terminated string name of the TokenId used as the default.
pDataKey
[in] Address of an ISpDataKey interface that specifies the system registry key from which to create the token.

Return values

Value	**Description**
S_OK	Function completed successfully.
E_POINTER	At least one of the parameters is invalid or bad.
SPERR_ALREADY_INITIALIZED	Token is already initialized.
SPERR_TOKEN_DELETED	Key has been deleted.
E_OUTOFMEMORY	Exceeded available memory.

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpObjectTokenCategory

The ISpObjectToken interface sets object token entries into the registry.

In general, attributes are null-terminated strings comprising a series of key:definition relationships. For example, a token may be defined as:

"vendor=microsoft;language=409;emptyflag=;someflag;..."

In this instance.

- "vendor=microsoft" means a string exists under TokenID\attributes with name *vendor* and value "microsoft";
- "emptyflag=" means a string exists under TokenID\attributes with name *emptyflag* and value "";
- "someflag" means a string exists under TokenID\attributes with name *someflag* and any value.

ISpObjectTokenCategory inherits from ISpDataKey.

Methods in Vtable Order

ISpObjectToken Methods	**Description**
SetId	Sets the CategoryId
GetId	Retrieves the CategoryId.
GetDataKey	Gets the data key associated with a specific location.
EnumTokens	Enumerates the tokens for the category.
SetDefaultTokenId	Sets a specific TokenId as the default for the category.
GetDefaultTokenId	Retrieves the default TokenId for the category.

[This is preliminary documentation and subject to change.]

ISpObjectTokenCategory::SetId

ISpObjectTokenCategory::SetId sets the CategoryId.

This may be called only once.

```
HRESULT SetId(
   const WCHAR   *pszCategoryId,
   BOOL           fCreateIfNotExist
);
```

Parameters

pszCategoryId
[in] The null-terminated string name of category to set.
fCreateIfNotExist
[in] An optional parameter allowing the object to be created if not currently existing. The default is FALSE unless otherwise specified.

Return values

Value	**Description**
S_OK	Function completed successfully.
SPERR_ALREADY_INITIALIZED	Category interface is already initialized.

E_INVALIDARG	*pszCategoryId* is invalid or bad.
FAILED(hr)	Appropriate error message.

Notes

Category IDs be be in the following form.

"HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\

Speech\Recognizers"

The only acceptable HKEYs are:

HKEY_CLASSES_ROOT

HKEY_CURRENT_USER

HKEY_LOCAL_MACHINE

HKEY_CURRENT_CONFIG

Examples

The following snippet creates an new category and sets the ID. The code also shows the required steps for removing a category.

```
HRESULT hr;

CComPtr cpSpCategory;
CComPtr cpSpRegDataKey;
HKEY hkey;

hr = cpSpCategory.CoCreateInstance(CLSID_SpObjectTokenCategory);
//Check return code

hr = cpSpCategory->SetId(L"HKEY_LOCAL_MACHINE\\SOFTWARE\\Microsoft\\S
//Check return code

//delete this bogus category
hr = g_Unicode.RegOpenKeyEx(HKEY_LOCAL_MACHINE,
        L"SOFTWARE\\Microsoft\\Speech",
        0, KEY_READ | KEY_WRITE, &hkey);
//Check return code

hr = cpSpRegDataKey.CoCreateInstance(CLSID_SpDataKey);
//Check return code

hr = cpSpRegDataKey->SetKey(hkey, false);
//Check return code

hr = cpSpRegDataKey->DeleteKey(L"bogus");
//Check return code
```

[This is preliminary documentation and subject to change.]

ISpObjectTokenCategory::GetId

ISpObjectTokenCategory::GetId retrieves the category ID.

```
HRESULT GetId(
   WCHAR    **ppszCoMemCategoryId
);
```

Parameters

ppszCoMemCategoryId
[in] The null-terminated string name of the current category. *ppszCoMemCategoryId* must be freed when no longer required.

Return values

Value	Description
S_OK	Function completed successfully.
SPERR_UNINITIALIZED	Category interface is not initialized.
E_POINTER	*ppszCoMemCategoryId* is invalid or bad.
FAILED(hr)	Appropriate error message.

Example

The following snippet retrieves CategoryId for SPCAT_VOICES.

```
HRESULT hr;

CComPtr cpSpCategory;
CSpCoTaskMemPtr cpwszOldID;

hr = SpGetCategoryFromId(SPCAT_VOICES, &cpSpCategory);
//Check return code


hr = cpSpCategory->GetId(&cpwszOldID);
//Check return code
```

[This is preliminary documentation and subject to change.]

ISpObjectTokenCategory::GetDataKey

ISpObjectTokenCategory::GetDataKey gets the data key associated with a specific location.

```
HRESULT GetDataKey(
   SPDATAKEYLOCATION   spdkl,
   ISpDataKey        **ppDataKey
);
```

Parameters

spdkl
    [in] The registry's top-level node to be searched.
ppDataKey
    [out] The data key interface associated with the location *spdkl*.

Return values

Value	Description
S_OK	Function completed successfully.
SPERR_UNINITIALIZED	Data key interface is not initialized.
E_POINTER	*ppDataKey* is invalid or bad.
FAILED(hr)	Appropriate error message.

Example

The following snippet retrieves the data key associated with the local machine registry for SPCAT_VOICES.

```
HRESULT hr;

CComPtr cpSpCategory;
CComPtr cpSpDataKey;

hr = SpGetCategoryFromId(SPCAT_VOICES, &cpSpCategory);
//Check return code


hr = cpSpCategory->GetDataKey(SPDKL_LocalMachine, &cpSpDataKey);
//Check return code
```

[This is preliminary documentation and subject to change.]

ISpObjectTokenCategory::EnumTokens

ISpObjectTokenCategory::EnumTokens enumerates the tokens for the category by attempting to match specified requirements.

```
HRESULT EnumTokens(
   const WCHAR          *pszReqAttribs,
   const WCHAR          *pszOptAttribs,
   IEnumSpObjectTokens   **ppEnum
);
```

Parameters

pszReqAttribs
: [in] The string of required attributes for the token.

pszOptAttribs
: [in] The string of optional attributes for the token. The order in which the tokens are listed in *ppEnum* is based on the order they match *pszOptAttribs*.

ppEnum
: [out] The enumerated list of tokens found.

Return values

Value	Description
S_OK	Function completed successfully.
SPERR_UNINITIALIZED	Data key interface is not initialized.
E_POINTER	At least one of the parameters is invalid or bad.
FAILED(hr)	Appropriate error message.

Example

The following code snippet demonstrates getting a complete enumerated token list. Since no specific requirement is given (*pszReqAttribs* and *pszOptAttribs* are NULL), all values are returned for SPCAT_VOICES.

```
HRESULT hr;

CComPtr cpSpCategory;
CComPtr cpSpEnumTokens;

hr = SpGetCategoryFromId(SPCAT_VOICES, &cpSpCategory);
//Check return code

hr = cpSpCategory->EnumTokens(NULL, NULL, &cpSpEnumTokens);
//Check return code
```

[This is preliminary documentation and subject to change.]

ISpObjectTokenCategory::SetDefaultTokenI

ISpObjectTokenCategory::SetDefaultTokenI

ISpObjectTokenCategory::SetDefaultTokenId sets a specific TokenId as the default for the category.

The defaults are stored either directly in the category by setting the DefaultTokenID value in the category data key, or indirectly by the DefaultTokenIDLocation.

```
HRESULT SetDefaultTokenId(
   const WCHAR   *pszTokenId
);
```

Parameters

pszTokenId
[in] The null-terminated string name of the TokenId to be used as the default.

Return values

Value	Description
S_OK	Function completed successfully.
SPERR_UNINITIALIZED	Data key interface is not initialized.
E_INVALIDARG	*pszTokenId* is invalid or bad.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpObjectTokenCategory::GetDefaultToken

ISpObjectTokenCategory::GetDefaultTokenId retrieves the default TokenId for the category.

.

```
HRESULT GetDefaultTokenId(
   const WCHAR   **pszTokenId
);
```

Parameters

pszTokenId
[in] The null-terminated string name of the TokenId used as the default.

Return values

Value	Description
S_OK	Function completed successfully.
SPERR_UNINITIALIZED	Data key interface is not initialized.
E_POINTER	*pszTokenId* is invalid or bad.
FAILED(hr)	Appropriate error message.

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpObjectToken

ISpObjectToken inherits from ISpDataKey.

Methods in Vtable Order

ISpObjectToken Methods	Description
SetID	Sets the category ID for object token.
GetID	Retrieves the object identifier for an object token.
GetCategory	Retrieves the category if one is available for the specified token.
CreateInstance	Creates an instance of an object.
GetStorageFileName	Retrieves the object token file name from the registry.
RemoveStorageFileName	Removes the object token file name from the registry.
Remove	Removes an object token.
IsUISupported	Determines if the UI associated with the object is supported.
DisplayUI	Displays the UI associated with the object.

[This is preliminary documentation and subject to change.]

ISpObjectToken::SetId

ISpObjectToken::SetId sets the CategoryId for object token.

This may be called only once.

```
HRESULT SetId(
   const WCHAR    *pszCategoryId,
   const WCHAR    *pszTokenId,
   BOOL            fCreateIfNotExist
);
```

Parameters

pszCategoryId
[in] The null-terminated string name of category to set.
pszTokenId
[in] The null-terminated string name of token to set.
fCreateIfNotExist
[in] A Boolean indicating the object is to be created if not currently existing. TRUE allows the creation; FALSE does not.

Return values

Value	**Description**
S_OK	Function completed successfully.
SPERR_ALREADY_INITIALIZED	Category interface is already initialized.
SPERR_TOKEN_DELETED	Key has been deleted.
E_INVALIDARG	Either *pszCategoryId* and/or *pszTokenId* is invalid or bad.
FAILED(hr)	Appropriate error message.

Notes

CategoryIds appear in the fully qualified form as:

"HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\

Speech\Recognizers"

The only acceptable HKEYs are:

HKEY_CLASSES_ROOT,

HKEY_CURRENT_USER,

HKEY_LOCAL_MACHINE,

HKEY_CURRENT_CONFIG

[This is preliminary documentation and subject to change.]

ISpObjectToken::GetID

ISpObjectToken::GetID retrieves the object identifier for an object token. This ID can be used later to recreate a token instances.

```
HRESULT GetID(
   WCHAR    **ppszCoMemTokenId
);
```

Parameters

ppszCoMemTokenId
Address of a pointer to a null-terminated string that receives the identifier for the token object. The caller must call CoTaskMemFree() to free the string pointer.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	*ppszCoMemTokenId* is invalid or bad.
E_OUTOFMEMORY	Exceeded available memory.
SPERR_UNINITIALIZED	TokenId interface is not initialized.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpObjectToken::GetCategory

ISpObjectToken::GetCategory retrieves the category for a specified token if one is available.

```
HRESULT GetCategory(
   ISpObjectTokenCategory    **ppTokenCategory
);
```

Parameters

ppTokenCategory
[out] The category interface for the token. *ppTokenCategory* must be freed when no longer required.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	*ppTokenCategory* is invalid or bad.
SPERR_UNINITIALIZED	Token does not have a category.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpObjectToken::CreateInstance

ISpObjectToken::CreateInstance creates an instance of an object.

```
HRESULT CreateInstance(
   IUnknown    *pUnkOuter,
   DWORD        dwClsContext,
   REFIID       riid,
   void       **ppvObject
);
```

Parameters

pUnkOuter
[in] If the object is being created as part of an aggregate, this is a pointer to the controlling IUnknown interface of the aggregate. Otherwise, *pUnkOuter* must be NULL.

dwClsContext
[in] Context in which the code that manages the newly created object will run. It should be one of the following values:
CLSCTX_INPROC_SERVER
CLSCTX_INPROC_HANDLER
CLSCTX_LOCAL_SERVER
CLSCTX_REMOTE_SERVER

riid
[in] Reference to the identifier of the interface used to communicate with the newly created object. If *pUnkOuter* is NULL, this parameter is frequently the IID of the initializing interface; if *pUnkOuter* is non-NULL, *riid* must be IID_IUnknown.

ppvObject
[out, iid_is(riid)] Address of pointer variable that receives the interface pointer requested in *riid*. Upon successful return, *ppvObject* contains the requested interface pointer. If the object does not support the interface specified in *riid*, the implementation must set *ppvObject* to NULL.

Return values

Value	Description
S_OK	Function completed successfully.

E_POINTER	*ppvObject* is invalid or bad.
E_INVALIDARG	*pUnkOuter* is invalid or bad.
SPERR_UNINITIALIZED	Either the data key or the token delegator interface is not initialized.
SPERR_TOKEN_DELETED	Key has been deleted.
FAILED(hr)	Appropriate error message.

Return values

The following code snippet creates an InProc server instance.

```
HRESULT hr;

CComPtr cpSpObjectToken;
CComPtr cpSpObjectWithToken;

hr = SpGetDefaultTokenFromCategoryId(SPCAT_VOICES, &cpSpObjectToken);
//Check return value

hr = cpSpObjectToken->CreateInstance(
                NULL, CLSCTX_INPROC_SERVER, IID_ISpObjectWithToken,
                (void **)&cpSpObjectWithToken
        );
//Check return value
```

[This is preliminary documentation and subject to change.]

ISpObjectToken::GetStorageFileName

ISpObjectToken::GetStorageFileName retrieves the object token file name from the registry.

```
HRESULT GetStorageFileName(
   REFCLSID        clsidCaller,
   const WCHAR    *pszValueName,
   int             nFolder,
   WCHAR         **ppszFilePath
);
```

Parameters

clsidCaller
[in] Globally unique identifier (GUID) of the calling object.
pszValueName
[in] Address of a null-terminated string containing the registry key name.
nFolder
[in] Value specifying the folder from which to retrieve the location.
ppszFilePath
[out] Address of a pointer to the null-terminated string that receives the file path information. Must be freed when no longer required.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	*ppszFilePath* is invalid or bad.
E_OUTOFMEMORY	Exceeded available memory.
S_FALSE	A new file was created.
E_INVALIDARG	*pszValueName* is invalid or bad.
SPERR_UNINITIALIZED	Either the data key or the token delegate interface is uninitialized.
SPERR_TOKEN_DELETED	Key has been deleted.
FAILED(hr)	Appropriate error message.

Example

The following code snippet creates and removes a token object for a test file.

```
HRESULT hr;
GUID guid0;

CComPtr cpSpObjectToken;
CSpCoTaskMemPtr cpFileName;

hr = SpGetDefaultTokenFromCategoryId(SPCAT_VOICES, &cpSpObjectToken);
//Check return value

ZeroStruct(guid0);
hr = cpSpObjectToken->GetStorageFileName(
                guid0, L"TestFile", CSIDL_FLAG_CREATE, &cpFileName
        );
//Check return value

hr = cpSpObjectToken->Remove(&guid0);
//Check return value
```

[This is preliminary documentation and subject to change.]

ISpObjectToken::RemoveStorageFileName

ISpObjectToken::RemoveStorageFileName removes the object token file name from the registry.

```
HRESULT RemoveStorageFileName(
   REFCLSID        clsidCaller,
   const WCHAR    *pszValueName,
   BOOL            fDeleteFile
);
```

Parameters

clsidCaller
[in] Globally unique identifier (GUID) of the calling object.
pszValueName
[in] Address of a null-terminated string containing the registry key name.
fDeleteFile
[in] Value specifying if the file should be deleted. TRUE deletes the file afterwards; FALSE does not.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*pszValueName* is invalid or bad.
SPERR_UNINITIALIZED	Either the data key or token delegate interface is not initialized.
SPERR_TOKEN_DELETED	Key has been deleted.
FAILED(hr)	Appropriate error message.

Example

The following code snippet creates a test file, removes it and manually deletes it. It may also have been deleted automatically by setting *fDeleteFile* to TRUE.

```
HRESULT hr;
GUID guid0;

CComPtr cpSpObjectToken;
CComPtr cpSpObjectWithToken;
CSpCoTaskMemPtr cpFileName;

hr = SpGetDefaultTokenFromCategoryId(SPCAT_VOICES, &cpSpObjectToken);
//Check return value

ZeroStruct(guid0);
// Create subkeys and value item to be deleted
hr = cpSpObjectToken->GetStorageFileName(
                guid0, L"test file", CSIDL_FLAG_CREATE, &cpFileName
                );

if (SUCCEEDED(hr))
{
        hr = cpSpObjectToken->RemoveStorageFileName(guid0, L"test fil
        //Check return value

        cpFileName.Clear();
}
```

[This is preliminary documentation and subject to change.]

ISpObjectToken::Remove

ISpObjectToken::Remove removes a token object.

```
HRESULT Remove(
   const GUID   *pclsidCaller
);
```

Parameters

pclsidCaller
: [in] Address of the identifier associated with the object token to remove. If *pclsidCaller* is NULL, then the entire token is removed; otherwise, only the specified section is removed.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	*pclsidCaller* is invalid or bad.
SPERR_UNINITIALIZED	The token ID interface is uninitialized.
SPERR_TOKEN_DELETED	Key has been deleted.
FAILED(hr)	Appropriate error message.

Example

The following code snippet creates and removes a token object for a test file.

```
HRESULT hr;
GUID guid0;

CComPtr cpSpObjectToken;
CSpCoTaskMemPtr cpFileName;

hr = SpGetDefaultTokenFromCategoryId(SPCAT_VOICES, &cpSpObjectToken);
//Check return value

ZeroStruct(guid0);
hr = cpSpObjectToken->GetStorageFileName(
                guid0, L"TestFile", CSIDL_FLAG_CREATE, &cpFileName
        );
//Check return value

hr = cpSpObjectToken->Remove(&guid0);
//Check return value
```

[This is preliminary documentation and subject to change.]

ISpObjectToken::IsUISupported

ISpObjectToken::IsUISupported determines if the user interface (UI) associated with the object is supported.

```
[local] HRESULT IsUISupported(
    REFGUID      guidTypeOfUI,
    void        *pvExtraData,
    ULONG        cbExtraData,
    IUnknown    *punkObject,
    BOOL        *pfSupported
);
```

Parameters

guidTypeOfUI
  [in] Globally unique identifier (GUID) of the object interface.
pvExtraData
  [in] Pointer to additional information needed for the object.
cbExtraData
  [in] Size, in bytes, of the *ExtraData.*
punkObject
  [in] Address of the IUnknown interface pointer.
pfSupported
  [out] Address of a variable that receives the value indicating support for the interface. This value is set to TRUE when this interface is supported, and FALSE when it is not.

Return values

Value	**Description**
S_OK	Function completed successfully.
E_INVALIDARG	One of the parameters is invalid or bad.
SPERR_UNINITIALIZED	Either the data key or token delegate interface is not initialized.
SPERR_TOKEN_DELETED	Key has been deleted.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpObjectToken::DisplayUI

ISpObjectToken::DisplayUI displays the user interface (UI) associated with the object.

```
[local] HRESULT DisplayUI(
   HWND           hwndParent,
   const WCHAR   *pszTitle,
   REFGUID        guidTypeOfUI,
   void          *pvExtraData,
   ULONG          cbExtraData,
   IUnknown      *punkObject
);
```

Parameters

hwndParent
[in] Specifies the handle of the parent window.
pszTitle
[in] Address of a null-terminated string containing the window title.
guidTypeOfUI
[in] Globally unique identifier (GUID) of the object.
pvExtraData
[in] Pointer to additional information needed for the object.
cbExtraData
[in] Size, in bytes, of the *ExtraData.*
punkObject
[in] Address of the IUnknown interface pointer.

Return values

Value	**Description**
S_OK	Function completed successfully.
E_INVALIDARG	One of the parameters is invalid or bad.
SPERR_UNINITIALIZED	Either the data key or token delegate interface is not initialized.
SPERR_TOKEN_DELETED	Key has been deleted.
FAILED(hr)	Appropriate error message.

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

IEnumSpObjectTokens

The IEnumSpObjectTokens interface is used to enumerate speech object tokens.

When to Implement

Implement this interface when a caller wants to be able to enumerate the speech token identifiers contained in a speech object.

When to Use

Call methods of the IEnumSpObjectTokens interface to enumerate the speech object tokens.

Methods in Vtable Order

IEnumSpObjectTokens Methods	Description
Next	Retrieves the next object token in the enumeration sequence.
Skip	Skips a specified number of object tokens in the enumeration sequence.
Reset	Resets the enumeration sequence to the beginning.
Clone	Creates a new enumerator object with the same items.
Item	Locates a specific token in the enumeration.
GetCount	Retrieves the number of object tokens contained in the enumeration sequence.

[This is preliminary documentation and subject to change.]

IEnumSpObjectTokens::Next

IEnumSpObjectTokens::Next retrieves the next object token in the enumeration sequence.

If there are fewer than the requested number of elements left in the sequence, the remaining elements are retrieved.

```
HRESULT Next(
   ULONG              celt,
   ISpObjectToken   **pelt,
   ULONG             *pceltFetched
);
```

Parameters

celt
: [in] The number of object tokens to retrieve.

pelt
: [out] Address of an array that receives ISpObjectToken pointers. If an error value is returned, no entries in the array are valid.

pceltFetched
: [out] Address of a variable that receives the number of ISpObjectToken pointers actually copied to the array. This parameter cannot be NULL if *celt* is greater than one. If this parameter is NULL, *celt* must be one.

Return values

Value	Description
S_OK	Function completed successfully.

E_POINTER	*pelt* is bad or invalid.
E_INVALIDARG	*pceltFetched* is bad or invalid or the number of objects is invalid.
SPERR_UNINITIALIZED	Attribute parser interface is not initialized.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

IEnumSpObjectTokens::Skip

IEnumSpObjectTokens::Skip skips a specified number of object tokens in the enumeration sequence.

```
HRESULT Skip(
   ULONG   celt
);
```

Parameters

celt
[in] Number of object tokens to skip in the enumeration sequence.

Return values

Value	Description
S_OK	Number of elements skipped was *celt*
S_FALSE	Number of elements skipped was less than *celt*
SPERR_UNINITIALIZED	Attribute parser interface is not initialized.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

IEnumSpObjectTokens::Reset

IEnumSpObjectTokens::Reset resets the enumeration sequence to the beginning.

```
HRESULT Reset ( void );
```

Parameters

None

Return values

Return values

Value	Description
S_OK	Method completed successfully.
SPERR_UNINITIALIZED	Attribute parser interface is not initialized.

[This is preliminary documentation and subject to change.]

IEnumSpObjectTokens::Clone

IEnumSpObjectTokens::Clone creates a new enumerator object with the same items.

Returns a new enumerator object with the same items but an independent index. The items in the clone are not guaranteed to be in the same order as the original enumerator.

```
HRESULT Clone(
   IEnumSpObjectTokens    **ppEnum
);
```

Parameters

ppEnum
: [out] Address of the IEnumSpObjectTokens pointer variable that receives the interface pointer to the cloned enumerator. Using Clone, it is possible to record a particular point in the enumeration sequence and then return to that point at a later time. The enumerator returned is of the same interface type as the one being cloned.

Return values

Value	Description
S_OK	Function completed successfully.
SPERR_UNINITIALIZED	Attribute parser interface is not initialized.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

IEnumSpObjectTokens::Item

IEnumSpObjectTokens::Item locates a specific token in the enumeration.

```
HRESULT Item(
   ULONG              Index,
   ISpObjectToken   **ppToken
);
```

```
);
```

Parameters

Index
    [in] Value indicating which token in the enumeration sequence to locate.
ppToken
    [out] Address of an ISpObjectToken interface pointer.

Return values

Value	Description
S_OK	Function completed successfully.
SPERR_NO_MORE_ITEMS	*Index* is greater than the amount of items available.
E_POINTER	*ppToken* is bad or invalid.
SPERR_UNINITIALIZED	Attribute parser interface is not initialized.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

IEnumSpObjectTokens::GetCount

IEnumSpObjectTokens::GetCount retrieves the number of object tokens contained in the enumeration sequence.

```
HRESULT GetCount(
   ULONG   *pulCount
);
```

Parameters

pulCount
    [out] The number of object token items contained in the enumeration sequence.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	*pulCount* is bad or invalid.
SPERR_UNINITIALIZED	Attribute parser interface is not initialized.
FAILED (hr)	Appropriate error message.

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpObjectWithToken

Methods in Vtable Order

ISpObjectWithToken Methods	Description
SetObjectToken	Creates an object token.
GetObjectToken	Retrieves an object token.

[This is preliminary documentation and subject to change.]

ISpObjectWithToken::SetObjectToken

ISpObjectWithToken::SetObjectToken creates an object token.

```
HRESULT SetObjectToken(
   ISpObjectToken   *pToken
);
```

Parameters

pToken
[in] Address of the ISpObjectToken interface creating this object token.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	*pToken* is invalid or bad.
E_OUTOFMEMORY	Exceeded available memory.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpObjectWithToken::GetObjectToken

ISpObjectWithToken::GetObjectToken retrieves an object token.

```
HRESULT GetObjectToken(
   ISpObjectToken   **ppToken
);
```

Parameters

ppToken
[out] Address of an ISpObjectToken interface that receives the object token.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	*ppToken* is invalid or bad.
E_OUTOFMEMORY	Exceeded available memory.
FAILED(hr)	Appropriate error message.

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpResourceManager

The ISpResourceManager interface provides access to the shared resources between different speech applications.

When to Use

Call methods of the ISpResourceManager interface to access the functionality of the shared resources.

Note: This interface inherits from IServiceProvider.

Methods in Vtable Order

ISpResourceManager Methods	Description
SetObject	Adds a service object to the current service list.
GetObject	Retrieves a service object from the current service list.

[This is preliminary documentation and subject to change.]

[This is preliminary documentation and subject to change.]

ISpResourceManager::SetObject

ISpResourceManager::SetObject adds a service object to the current service list.

```
HRESULT SetObject(
   REFGUID     guidServiceId,
   IUnknown    *pUnkObject
);
```

Parameters

guidServiceId
[in] The unique identifier of the service.
pUnkObject
[in] Address of the IUnknown interface of the object that is setting the service.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*pUnkObject* is bad or invalid.
E_OUTOFMEMORY	Exceeded available memory.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpResourceManager::GetObject

ISpResourceManager::GetObject retrieves a service object from the current service list.

If the HRESULT is not S_OK, then the caller must delete this object manually.

```
HRESULT GetObject(
   REFGUID     guidServiceId,
   REFCLSID    ObjectCLSID,
   REFIID      ObjectIID,
   BOOL        fReleaseWhenNoRefs,
   void       **ppObject
);
```

Parameters

guidServiceId
: [in] The unique identifier of the service.

ObjectCLSID
: [in] Class identifier of the object.

ObjectIID
: [in] Interface identifier of the object.

fReleaseWhenNoRefs
: [in] Boolean indicating whether or not the object is an aggregate. If TRUE, the object is not a aggregate and may be released when no longer needed. FALSE indicates that the object is an aggregate and must be manually freed when no longer required.

ppObject
: [out] Address of a pointer that receives the interface pointer of the service.

Return values

Value	**Description**
S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.
E_POINTER	*ppObject* is bad or invalid.
REGDB_E_CLASSNOTREG	Class is not registered.
E_OUTOFMEMORY	Exceeded available memory.
FAILED(hr)	Appropriate error message.

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpTask

The ISpTask interface allows a single thread to process several events. This permits smaller tasks to run without interfering of more important processes. After the task object is notified, ISpTask::Execute may be called to implement the effects.

When to Use

ISpTask is most useful with multiprocessor computers. Its allows an efficient allocation of tasks based on the current availability of processor time.

Note:

This is not a COM interface.

Methods in Vtable Order

ISpTask Methods	**Description**

Execute Implements the processing of a thread.

[This is preliminary documentation and subject to change.]

ISpTask::Execute

ISpTask::Execute implements the processing of a thread. This will be application specific.

.

```
virtual HRESULT STDMETHODCALLTYPE Execute(
   void                    *pvTaskData,
   volatile const BOOL     *pfContinueProcessing
) = 0;
```

Parameters

pvTaskData
: [in] The specific information for the application.

pfContinueProcessing
: [in] Boolean indicating if the process should continue. TRUE continues the process; otherwise FALSE.

Return values

The return value is application specific.

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

Speech Recognition Interfaces

The following section covers:

- ISpRecoContext
- ISpRecoGrammar
- ISpRecoResult
- ISpRecognizer
- ISpPhrase
- ISpPhraseAlt
- ISpProperties

Microsoft Speech SDK

[This is preliminary documentation and subject to change.]

ISpRecoContext

This interface inherits from ISpEventSource.

Methods in Vtable Order

ISpRecoContext Methods	Description
GetRecognizer	Returns a reference to the current engine object.
CreateGrammar	Creates a SpGrammar object.
GetStatus	Retrieves current context state information.
GetMaxAlternates	Retrieves the maximum number of alternates that will be generated for command and control grammars.
SetMaxAlternates	Sets the maximum number of alternates returned for command and control grammars.
SetAudioOptions	Sets the audio options for results from this context.
GetAudioOptions	Retrieves the audio options for the context.
DeserializeResult	Creates a new result object from a serialized result.
Bookmark	Sets a bookmark within the current recognition stream.
SetAdaptationData	Passes a block of text to the SR engine which it can use to adapt the active language models.
Pause	Pauses the engine object to synchronize with the SR engine.
Resume	Resumes the SR engine from the paused state and restarts the recognition process.
SetVoice	Sets the associated ISpVoice to this context.
GetVoice	Retrieves a reference to the associated ISpVoice object.
SetVoicePurgeEvent	Sets the SR engine events that stop audio output, and purges the current speaking queue.
GetVoicePurgeEvent	Retrieves the set of SR engine events that stop audio output, and purges the current speaking queue.

[This is preliminary documentation and subject to change.]

ISpRecoContext::GetRecognizer

ISpRecoContext::GetRecognizer returns a reference to the current recognition instance object associated with this context.

```
HRESULT GetRecognizer(
   ISpRecognizer    **ppRecognizer
);
```

Parameters

ppRecoInstance
: [out] Address of a pointer that receives the ppRecognizer interface.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	Invalid pointer.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpRecoContext::CreateGrammar

ISpRecoContext::CreateGrammar creates a SpRecoGrammar object.

```
HRESULT CreateGrammar(
   DWORD_PTR          *pdwpGrammarId,
   ISpRecoGrammar     **ppGrammar
);
```

Parameters

pdwpGrammarId
: [in] Specifies the grammar identifier. This identifier is associated with all result objects from the grammar. The identifier is used by the application and is not required.

ppGrammar
: [out] Address of a pointer which receives the ISpRecoGrammar object.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	*ppGrammar* is invalid.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

[This is preliminary documentation and subject to change.]

ISpRecoContext::GetStatus

ISpRecoContext::GetStatus retrieves current state information associated with a context.

```
HRESULT GetStatus(
   SPRECOCONTEXTSTATUS   *pStatus
);
```

Parameters

pStatus
    [out] Address of the SPRECOCONTEXTSTATUS structure that receives the context state information.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	*pStatus* is invalid or bad.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpRecoContext::GetMaxAlternates

ISpRecoContext::GetMaxAlternates retrieves the maximum number of alternates that the SR engine will return for command and control grammars associated with this context. Note that this method has no effect on dictation grammars.

```
HRESULT GetMaxAlternates(
   ULONG   *pcMaxAlternates
);
```

Parameters

pcMaxAlternates
    [out] The maximum number of alternates.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	*pcMaxAlternates* is invalid or bad.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpRecoContext::SetMaxAlternates

ISpRecoContext::SetMaxAlternates sets the maximum number of alternates the SR engine returns for command and control grammars associated with this recognition context. Note that this method has no effect on dictation grammars.

```
HRESULT SetMaxAlternates(
   DWORD   cMaxAlternates
);
```

Parameters

cMaxAlternates
[in] Specifies the maximum number of alternates the engine will return.

Return values

Value	Description
S_OK	Function completed successfully.

[This is preliminary documentation and subject to change.]

ISpRecoContext::SetAudioOptions

ISpRecoContext::SetAudioOptions sets the audio options for result objects from this recognition context.

The SetAudioOptions method enables or disables the retention of audio with result objects and can change the retained audio format. By default, when an audio format is not specified, the audio will be retained in the same format as the SR engine used to perform the recognition.

```
HRESULT SetAudioOptions(
   SPAUDIOOPTIONS       Options,
   const GUID          *pAudioFormatId,
   const WAVEFORMATEX  *pWaveFormatEx
);
```

Parameters

Parameters

Options
[in] Flag of type SPAUDIOOPTIONS indicating the option. It must be one of the following:

Value	
SPAO_NONE	Do not retain audio for results.
SPAO_RETAIN_AUDIO	Retain audio for all future results.

pAudioFormatId
[in] The audio stream format GUID. Usually this value is *SPFID_WaveForamatEx*. If this value is NULL, the retained audio format will not be changed.

pWaveFormatEx
[in] The audio stream wave format. This is only valid if **pAudioFormatId* == *SPFID_WaveFormatEx*.

Return values

Value	**Description**
S_OK	Function completed successfully.
E_INVALIDARG	*Options* is not one of the correct types.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpRecoContext::GetAudioOptions

ISpRecoContext::GetAudioOptions retrieves the audio options for a given stream.

```
HRESULT GetAudioOptions(
   SPAUDIOOPTIONS         *Options,
   const GUID             *pAudioFormatId,
   const WAVEFORMATEX    **pWaveFormatEx
);
```

Parameters

Options
[out] Flag of type SPAUDIOOPTIONS indicating the options set for this context.

pAudioFormatId
[in] The audio stream GUID to retrieve. This value can be NULL.

pWaveFormatEx

[in] The audio stream wave format to retrieve. This can be NULL if *pAudioFormatId* is NULL.

Note: This data must be freed using *::CoTaskMemFree()*.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	One of the pointers is invalid or bad.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpRecoContext::DeserializeResult

ISpRecoContext::DeserializeResult creates a new result object from a serialized result.

```
HRESULT DeserializeResult(
   const SPSERIALIZEDRESULT   pSerializedResult,
   ISpRecoResult            **ppResult
);
```

Parameters

pSerializedResult
[in] The current serialized result.
ppResult
[out] The unserialized result object.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*pSerializedResult* is invalid or bad.
E_POINTER	*ppResult* is invalid or bad.
E_OUTOFMEMORY	Exceeded available memory.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpRecoContext::Bookmark

ISpRecoContext::Bookmark

ISpRecoContext::Bookmark sets a bookmark within the current recognition stream. When the engine reaches the specified stream position, a bookmark event is added to the event queue.

```
HRESULT Bookmark(
   SPBOOKMARKOPTIONS   Options,
   ULONGLONG           ullStreamPosition,
   LPARAM              lParamEvent
);
```

Parameters

Options
[in] Flags of type SPBOOKMARKOPTIONS indicating the options associated with the bookmark. Must be one of the following values:

SPBO_NONE	Context will not be paused when a bookmark event occurs.
SPBO_PAUSE	Context is paused when a bookmark event occurs.

ullStreamPosition
[in] The position of the bookmark within the stream.

If *SP_STREAMPOS_ASAP* is specified, the bookmark event will occur when the engine reaches a synchronization point. This is usually combined with *SPBO_PAUSE* to asynchronously pause the recognition stream. If *SP_STREAMPOS_REALTIME* is specified, the bookmark event occurs when the SR engine reaches the point where the audio device is at the time of the call.

lParamEvent
[in] The *lparam* for the SAPI bookmark event, and can be any value the application uses to uniquely identify this bookmark event.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*Options* has a bad value.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpRecoContext::SetAdaptationData

ISpRecoContext::SetAdaptationData sets a string to be adapted by the current recognition context.

```
HRESULT SetAdaptationData(
   const WCHAR   *pAdaptationData,
   const ULONG   cch
   const ULONG   cch
);
```

Parameters

pAdaptationData
    [in] The string to adapt.
cch
    [in] The number of characters in *pAdaptationData*.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*pAdaptationData* is invalid or *cch* equals zero.
E_OUTOFMEMORY	Exceeded available memory.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpRecoContext::Pause

ISpRecoContext::Pause requests the engine object to pause and synchronize with the SR engine.

The SR engine is paused at its synchronization point to allow grammars and rule states to be changed freely. The paused condition remains until the Resume method is called.

Note: The caller must call Resume once for every call that is made to Pause.

```
HRESULT Pause(
   DWORD   dwFlags
);
```

Parameters

dwFlags
    [in] Reserved, must be 0.

Return values

Value	Description
S_OK	Function completed successfully.

Note:

- Pausing the SR engine will stop the recognition activity, but input audio will continue to be collected.

ISpRecoContext::Resume

ISpRecoContext::Resume releases the SR engine from the paused state and restarts the recognition process.

This method must be called after a call to ISpRecoContext::Pause, a bookmark event occurs that pauses the recognition engine, or an auto-pause rule is recognized.

```
HRESULT  Resume (
  DWORD dwReserved
);
```

Parameters

dwReserved
[in] Reserved, must be 0.

Return values

Value	Description
S_OK	Function completed successfully.

ISpRecoContext::SetVoice

ISpRecoContext::SetVoice sets the associated ISpVoice to an object.

```
HRESULT SetVoice(
   ISpVoice   *pVoice,
   BOOL        fAllowFormatChanges
);
```

Parameters

pVoice
[in] The voice interface to be associated.
fAllowFormatChanges
[in] Boolean allowing the voice format alteration by the engine.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	*pVoice* is invalid or bad.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpRecoContext::GetVoice

ISpRecoContext::GetVoice retrieves a reference to the associated ISpVoice object.

```
HRESULT GetVoice(
   ISpVoice    **ppVoice
);
```

Parameters

ppVoice
    [in] Address of the ISpVoice interface.

Return values

Value	Description
S_OK	Function completed successfully.
FAILED(hr)	Appropriate error message.
E_POINTER	Invalid pointer.

[This is preliminary documentation and subject to change.]

ISpRecoContext::SetVoicePurgeEvent

ISpRecoContext::SetVoicePurgeEvent sets the SR engine events that stop audio output, and purges the current speaking queue. It passes the events as extra event interests to the engine.

```
HRESULT SetVoicePurgeEvent(
   ULONGLONG   ullEventInterest
);
```

Parameters

ullEventInterest
[in] The set of flags indicating the event interests. One of the following must be included:
SPEI_REQUESTUI
SPEI_INTERFERENCE
SPEI_END_SR_STREAM
SPEI_SR_BOOKMARK
SPEI_SOUNDSTART
SPEI_SOUNDEND
SPEI_PHRASESTART
SPEI_HYPOTHESIS
SPEI_RECOGNITION
SPEI_FALSERECOGNITION

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	One or more of the interests set is not allowed.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpRecoContext::GetVoicePurgeEvent

ISpRecoContext::GetVoicePurgeEvent retrieves the set of SR engine events that stop audio output, and purges the current speaking queue. The events are set by ISpRecoContext::SetVoicePurgeEvent.

```
HRESULT GetVoicePurgeEvent(
   ULONGLONG   *pullEventInterest
);
```

Parameters

pullEventInterest
[out] The set of flags indicating the event interests.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	*pullEventInterest* is invalid or bad.
FAILED(hr)	Appropriate error message.

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpRecoGrammar

Methods in Vtable Order

ISpRecoGrammar Methods	**Description**
GetGrammarId	Retrieves the grammar identifier associated with the application.
GetRecoContext	Retrieves the context object that loaded this grammar.
LoadCmdFromFile	Loads a command from a file.
LoadCmdFromObject	Loads a command from an object.
LoadCmdFromResource	Loads a command from resource.
LoadCmdFromMemory	Loads a command from memory.
LoadCmdFromProprietaryGrammar	Loads a command from a proprietary grammar.
SetRuleState	Activates or deactivates a rule by its RuleName.
SetRuleIdState	Activates or deactivates a rule by its RuleID.
LoadDictation	Loads a dictation for an engine.
UnloadDictation	Unloads a dictation from an engine.
SetDictationState	Sets a dictation state to active or inactive.
SetWordSequenceData	Sets word sequence data used by <TEXTBUFFER>.
SetTextSelection	Sets the insertion point (using word sequence data buffer).
IsPronounceable	Determines if the word has a pronunciation.
SetGrammarState	Changes the global grammar state.
SaveCmd	Allows applications using dynamic grammars to save the current grammar state to a stream.

[This is preliminary documentation and subject to change.]

ISpRecoGrammar::GetGrammarId

ISpRecoGrammar::GetGrammarId retrieves the grammar identifier associated with the application.

```
HRESULT GetGrammarId(
   DWORD_PTR    *pdwpGrammarId
);
```

Parameters

pdwpGrammarId
[out] Address of the grammar identifier associated with the grammar.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	*pdwGrammarId* is invalid or bad.

[This is preliminary documentation and subject to change.]

ISpRecoGrammar::GetRecoContext

ISpRecoGrammar::GetRecoContext retrieves the context object that loaded this grammar.

```
HRESULT GetRecoContext(
   ISpRecoContext    **ppRecoCtxt
);
```

Parameters

ppRecoCtxt
[out] Address of a pointer to an ISpRecoContext object that receives the recognition context object pointer.

Return values

Value	Description
S_OK	Function completed successfully.

E_POINTER	*ppRecoCtxt* is invalid or bad.
FAILED(hr)	Rule not loaded.

[This is preliminary documentation and subject to change.]

ISpRecoGrammar::LoadCmdFromFile

ISpRecoGrammar::LoadCmdFromFile loads a command from a file. If the file is an XML file, the information is compiled on-the-fly. Otherwise *Options* must be SPLO_DYNAMIC for it to compile. The file has to reside on the local machine (no URL loads).

```
HRESULT LoadCmdFromFile(
    WCHAR           *pszFileName,
    SPLOADOPTIONS    Options
);
```

Parameters

pszFileName
: [in, string] The file name containing the command.

Options
: [in] Flag of type SPLOADOPTIONS indicating whether the file should be loaded statically or dynamically.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*pszFileName* is invalid or bad. Alternatively, *Options* is neither SPLO_STATIC nor SPLO_DYNAMIC.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpRecoGrammar::LoadCmdFromObject

ISpRecoGrammar::LoadCmdFromObject loads a command from an object.

```
HRESULT LoadCmdFromObject(
   REFCLSID         rcid,
   const WCHAR     *pszGrammarName,
   SPLOADOPTIONS    Options
);
```

Parameters

rcid
    [in] The reference class ID of the object containing the command.
pszGrammarName
    [in, string] The grammar name of the object containing the command.
Options
    [in] Flag of type SPLOADOPTIONS indicating whether the file should be loaded statically or dynamically.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*pszGrammarName* is invalid or bad. Alternatively, *Options* is neither SPLO_STATIC nor SPLO_DYNAMIC.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpRecoGrammar::LoadCmdFromResource

ISpRecoGrammar::LoadCmdFromResource loads a command from resource.

```
HRESULT LoadCmdFromResource(
   HMODULE          hModule,
   const WCHAR     *pszResourceName,
   const WCHAR     *pszResourceType,
   WORD             wLanguage,
   SPLOADOPTIONS    Options
);
```

Parameters

hModule
    [in] Handle to the module whose file name is being requested. If this parameter is NULL, it passes back the path for the file containing the current process.
pszResourceName
    [in, string] The name of the resource.
pszResourceType
    [in, string] The type of the resource.
wLanguage
    [in] The language ID.
Options
    [in] Flag of type SPLOADOPTIONS indicating whether the file should be loaded statically or dynamically.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	Either *pszResourceName* or *pszResourceType* is invalid or bad. It may also indicate *hModule* could not be found. Alternatively, *Options* is neither SPLO_STATIC nor SPLO_DYNAMIC.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpRecoGrammar::LoadCmdFromMemory

ISpRecoGrammar::LoadCmdFromMemory loads a command from memory.

```
HRESULT LoadCmdFromMemory(
   const SPBINARYGRAMMAR   *pBinaryData,
   SPLOADOPTIONS            Options
);
```

Parameters

pBinaryData
[in] The serialized header buffer.

Options
[in] Flag of type SPLOADOPTIONS indicating whether the file should be loaded statically or dynamically.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	Either *pBinaryData* or one of its members is invalid or bad. It may also indicate *pBinaryData->FormatId* is not SPGDF_ContextFree. Alternatively, *Options* is neither SPLO_STATIC nor SPLO_DYNAMIC.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpRecoGrammar::LoadCmdFromProprieta

ISpRecoGrammar::LoadCmdFromProprietaryGrammar loads a command from a proprietary grammar.

```
HRESULT LoadCmdFromProprietaryGrammar(
   REFGUID          rguidParam,
   const WCHAR     *pszStringParam,
   const void      *pvDataParam,
   ULONG            cbDataSize,
   SPLOADOPTIONS    Options
);
```

Parameters

rguidParam
    [in] Unique identifier of the grammar.
pszStringParam
    [in, string] The string command.
pvDataParam
    [in] Additional information for the process.
cbDataSize
    [in] The size, in bytes, of *pvDataParam*.
Options
    [in] Flag of type SPLOADOPTIONS indicating whether the file should be loaded statically or dynamically. This value must be SPLO_STATIC.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*pszStringParam* or *pvDataParam* is invalid or bad. Alternatively, *Options* is not SPLO_STATIC.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpRecoGrammar::SetRuleState

ISpRecoGrammar::SetRuleState activates or deactivates a rule by its RuleName.

```
HRESULT SetRuleState(
   const WCHAR    *pszName,
   const WCHAR    *pszValue,
   SPRULESTATE     NewState
);
```

Parameters

pszName
    [in, string] Address of a null-terminated string containing the rule name. If NULL, all rules are affected.

pszValue
: [in, string] Address of a null-terminated string containing the rule value. If NULL, all values are affected.

NewState
: [in] Flag of type SPRULESTATE indicating the new rule state.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*pszName* or *pszValue* is invalid or bad.
SPERR_UNINITIALIZED	The object has not been properly initialized.
FAILED(hr)	Appropriate error message.

Example

The following snippet loads a grammar, then attempts to activate a single rule ("playcard") and immediately deactivate it.

```
HRESULT hr;
CComPtr<ISpRecognizer> cpRecognizer;
CComPtr<ISpRecoContext> cpRecoContext;
CComPtr<ISpRecoGrammar> cpRecoGrammar;

hr = InitReco(cpRecognizer, CLSID_SpInprocRecognizer, cpRecoContext);
//Check return value

hr = LoadGrammar(cpRecoContext,TESTGRAMMAR_FILENAME, cpRecoGrammar,GR
//Check return value

hr = cpRecoGrammar->SetRuleState(L"playcard", NULL, SPRS_ACTIVE);
//Check return value


//Deactivate the rule
hr = cpRecoGrammar->SetRuleState(L"playcard", NULL, SPRS_INACTIVE);
//Check return value
```

[This is preliminary documentation and subject to change.]

ISpRecoGrammar::SetRuleIdState

ISpRecoGrammar::SetRuleIdState activates or deactivates a rule by its RuleID.

```
HRESULT SetRuleIdState(
   DWORD          dwRuleId,
   SPRULESTATE    NewState
);
```

Parameters

dwRuleId

dwRuleId
[in] Value specifying the grammar rule identifier.
NewState
[in] Flag of type SPRULESTATE indicating the new rule state.

Return values

Value	Description
S_OK	Function completed successfully.
FAILED(hr)	Appropriate error message.

Examples Using This Method

SDK: Coffee2.

[This is preliminary documentation and subject to change.]

ISpRecoGrammar::LoadDictation

ISpRecoGrammar::LoadDictation loads a dictation grammar for an engine.

```
HRESULT LoadDictation(
   const WCHAR   *pszTopicName,
   SPLOADOPTIONS  Options
);
```

Parameters

pszTopicName
[in, optional, string] The string containing the topic name. May be set to NULL. SAPI defines **SPTOPIC_SPELLING**
Options
[in] Flag of type SPLOADOPTIONS indicating whether the file should be loaded statically or dynamically. This value must be SPLO_STATIC.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*pszTopicName* is invalid or bad. Alternatively, *Options* is not SPLO_STATIC.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpRecoGrammar::UnloadDictation

ISpRecoGrammar::UnloadDictation unloads a dictation grammar from an engine.

```
HRESULT  UnloadDictation  ( void );
```

Parameters

None.

Return values

Value	Description
S_OK	Function completed successfully.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpRecoGrammar::SetDictationState

ISpRecoGrammar::SetDictationState sets a dictation state to either active or inactive.

```
HRESULT SetDictationState(
   SPRULESTATE   NewState
);
```

Parameters

NewState
[in] Flag of type SPRULESTATE indicating the new state of dictation.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*NewState* is not an acceptable value.
SPERR_UNINITIALIZED	A dictation is not currently loaded.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpRecoGrammar::SetWordSequenceData

ISpRecoGrammar::SetWordSequenceData

ISpRecoGrammar::SetWordSequenceData sets a word sequence buffer in the SR engine. The CFG grammar can refer to any subsequence of words in this buffer using the <TEXTBUFFER> tag.

```
HRESULT SetWordSequenceData(
   WCHAR   *pText,
   ULONG    cchText,
   const  SPTEXTSELECTIONINFO  *pInfo
);
```

Parameters

pText
: [in] Buffer containing the text to search for possible word sequences. The buffer is double-NULL terminated. If the buffer contains '\0' between words, the sub-sequence cannot contain words on either side of the '\0'. It is up to the SR engines to perform word breaking and text normalization for better performance. (**See me for an example**).

cchText
: [in] The number of characters (WCHAR) in pText.

pInfo
: [in] Address of the SPTEXTSELECTIONINFO structure that contains the selection information.

Return values

Value	**Description**
S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpRecoGrammar::SetTextSelection

ISpRecoGrammar::SetTextSelection sets the current text selection and insertion point information.

```
HRESULT SetTextSelection(
   const  SPTEXTSELECTIONINFO  *pInfo
);
```

Parameters

pInfo
: [in] Address of the SPTEXTSELECTIONINFO structure that contains the text selection and insertion point information.

and insertion point information.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.
FAILED(hr)	Appropriate error message.

ISpRecoGrammar::IsPronounceable

ISpRecoGrammar::IsPronounceable calls the engine object to determine if the word has a pronunciation.

```
HRESULT IsPronounceable(
   const WCHAR  *pszWord,
   BOOL          pfPronounceable
);
```

Parameters

pszWord
: [in, string] The word to test. Length must be equal to or less than SP_MAX_WORD_LENGTH.

pfPronounceable
: [out] Flag indicating the results of the test. TRUE, if a pronunciation was found; otherwise, FALSE.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	Either *pszWord* or *pfPronounceable* is invalid or bad.
FAILED (hr)	Appropriate error message.

ISpRecoGrammar::SetGrammarState

ISpRecoGrammar::SetGrammarState sets the grammar mode.

If eGrammarState is SPGM_DISABLED, then SAPI will remember the current rule activation state, so that when the grammar state is set to SPGM_ENABLED, it restores the grammar rules back to each of the original activation states. While the grammar is set to SPGM_DISABLED, the application can still activate and deactivate rule. The effect is not communicated to the SR engine (but remembered by SAPI) until the grammar is enabled again.

If eGrammarState is SPGM_EXCLUSIVE, then SAPI will disable all other grammars in the system, unless another grammar is already exclusive. Activation and deactivation commands are buffered for all other grammars until the exclusive grammar is set to SPGM_ENABLED again.

```
HRESULT SetGrammarState(
   SPGRAMMARSTATE    eGrammarState
);
```

Parameters

eGrammarState
[in] Flag of type SPGRAMMARSTATE indicating the new state of the grammar.

Return values

Value	Description
S_OK	Function completed successfully.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpRecoGrammar::SaveCmd

ISpRecoGrammar::SaveCmd allows applications using dynamic grammars to save the current grammar state to a stream.

```
HRESULT SaveCmd(
   IStream    *pSaveStream,
   WCHAR     **ppCoMemErrorText
);
```

Parameters

pSaveStream
[in] The stream to save.
ppCoMemErrorText
[out] Optional parameter of a null-terminated string containing error messages that occurred during the save operation.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*pSaveStream* is invalid or bad.
SPERR_NOT_DYNAMIC_GRAMMAR	Command was loaded but compiler is not available.
SPERR_UNINITIALIZED	Compiler is not available.
E_POINTER	*ppCoMemErrorText* is invalid or bad.
FAILED (hr)	Appropriate error message.

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpRecoResult

Note: This interface inherits from ISpPhrase.

ISpRecoResult Methods	Description
GetGrammarId	Retrieves the grammar identifier associated with a result.
GetResultTimes	Retrieves the time information associated with the result.
GetAlternates	Retrieves an array containing alternate phrases.
GetAudio	Creates an audio stream for a given number of elements.
SpeakAudio	Plays the audio associated with a given range of elements.
Serialize	Creates a serialized copy of the recognition result object.
ScaleAudio	Converts the format of the retained audio to a different audio format.
GetRecoContext	Returns the recognition context object that is associated with this result.

[This is preliminary documentation and subject to change.]

ISpRecoResult::GetGrammarId

ISpRecoResult::GetGrammarId retrieves the grammar identifier associated with a result.

```
HRESULT GetGrammarId(
   DWORD_PTR    *pdwpGrammarId
);
```

Parameters

pdwpGrammarId
  [out] Address of the result grammar identifier.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	*pdwGrammarId* is invalid or bad.
SPERR_NOT_FOUND	Interface not found.

[This is preliminary documentation and subject to change.]

ISpRecoResult::GetResultTimes

ISpRecoResult::GetResultTimes retrieves the time information associated with the result.

```
HRESULT GetResultTimes(
   SPRECORESULTTIMES    *pTimes
);
```

Parameters

pTimes
  [out] Address of the SPRECORESULTTIMES data structure containing the time information associated with the result.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	*pTimes* is invalid or bad.
SPERR_NOT_FOUND	Interface not found.

Examples Using This Method

SDK: Coffee2, Coffee3, Coffee4.

[This is preliminary documentation and subject to change.]

ISpRecoResult::GetAlternates

ISpRecoResult::GetAlternates retrieves an array of pointers to ISpPhraseAlt objects containing alternate phrases.

```
HRESULT GetAlternates(
   ULONG          ulStartElement,
   ULONG          cElements,
   ULONG          ulRequestCount,
   ISpPhraseAlt  **ppPhrases,
   ULONG          *pcPhrasesReturned
);
```

Parameters

ulStartElement
[in] The starting element to consider for the alternates.
cElements
[in] The number of elements to consider. All elements may be requested by using the enumeration value SPPR_ALL_ELEMENTS of type SPPHRASERNG.
ulRequestCount
[in] The number of requested alternate phrase elements.
ppPhrases
[out] Address of an array of ISpPhraseAlt interface pointers that will contain the alternate phrases. The elements between the start of the *ulStartElement* element and the end of the *ulStartElement* and *cElements* element combined is the portion that will change. The rest of the elements will be included in each alternate phrase.
pcPhrasesReturned
[out] Pointer to a ULONG that receives the actual number of alternate phrases retrieved.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	*pcPhrasesReturned* is an invalid pointer. However, *ppPhrases* does not contain *ulRequestCount* allocations.
E_OUTOFMEMORY	Exceeded available memory.
E_INVALIDARG	*ulStartElement* is not less than the number of elements in owning interface. However, the number of expected elements exceeds the number of available elements in the owning interface.
S_FALSE	No analyzer is present or there is no driver data.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpRecoResult::GetAudio

ISpRecoResult::GetAudio creates an audio stream of the requested words from the audio data in the result object.

Even if there are no elements, that is, *ulStartElement* = 0 and *cElements* = 0, then the audio will still be played. There are "unrecognized" results that have no elements but do have audio.

```
HRESULT GetAudio(
   ULONG              ulStartElement,
   ULONG              cElements,
   ISpStreamFormat   **ppStream
);
```

Parameters

ulStartElement
[in] Value specifying from which element in the result data to start the audio stream .
cElements
[in] Value specifying the total number of words.
ppStream
[out] Address that will receive a pointer to an ISpStreamFormat object containing the audio data requested.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*cElements* is zero or the expected number of elements to count exceeds the number available.
E_POINTER	*ppStream* is an invalid pointer.
SPERR_NO_AUDIO_DATA	This result object does not have any audio data.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpRecoResult::SpeakAudio

ISpRecoResult::SpeakAudio is a shortcut, first calling ISpRecoResult::GetAudio and then calling ISpVoice::SpeakStream on the parent recognition context.

```
HRESULT SpeakAudio(
   ULONG    ulStartElement,
   ULONG    cElements,
   DWORD    dwFlags,
   ULONG   *pulStreamNumber
);
```

Parameters

ulStartElement
: [in] Value specifying with which element to start.

cElements
: [in] Value specifying the number of elements contained in the stream. A value of zero speaks all elements.

dwFlags
: [in] Value containing flag information associated with audio elements.

pulStreamNumber
: [out] Address of a variable containing the stream number information.

Return values

Value	**Description**
S_OK	Function completed successfully.
SPERR_NO_AUDIO_DATA	Result does not contain audio data.
FAILED(hr)	Appropriate error message.

Note: Return values may also be the same as ISpVoice::SpeakStream.

[This is preliminary documentation and subject to change.]

ISpRecoResult::Serialize

ISpRecoResult::Serialize creates a serialized copy of the recognition result object. The serialized copy can be saved and later restored using the ISpRecoContext::DeserializeResult method.

```
HRESULT Serialize(
   SPSERIALIZEDRESULT   **ppCoMemSerializedResult
);
```

Parameters

ppCoMemSerializedResult
: [out] Address of a pointer to the SPSERIALIZEDRESULT structure that receives the serialized result information. Call CoTaskMemFree() to free the memory associated with the serialized result object.

Return values

Value	**Description**
S_OK	Function completed successfully.

E_POINTER	*ppCoMemSerializedResult* is an invalid pointer.
E_OUTOFMEMORY	Exceeded available memory.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpRecoResult::ScaleAudio

ISpRecoResult::ScaleAudio converts an existing audio stream into a different audio format. Use the ISpPhrase::Discard method to completely discard audio data associated with a result object.

```
HRESULT ScaleAudio(
  const GUID            *pAudioFormatId,
  const WAVEFORMATEX    *pWaveFormatEx
);
```

Parameters

pAudioFormatId
[in] Address of the data format identifier. Typically, this value is *SPFID_WaveFormatEx.*

pWaveFormatEx
[in] Address of the WAVEFORMATEX structure that contains the audio format to convert to.

Note: This value must be NULL if *pAudioFormatId* is not specified as *SPFID_WaveForamtEx.*

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	Either *pAudioFormatId* or *pWaveFormatEx* is invalid or bad.
SPERR_NO_AUDIO_DATA	Either *ulPhrases* is zero or an audio stream is unavailable.
E_OUTOFMEMORY	Exceeded available memory.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpRecoResult::GetRecoContext

ISpRecoResult::GetRecoContext returns the recognition context object this result object is associated with.

```
HRESULT GetRecoContext(
   ISpRecoContext   **ppRecoContext
);
```

Parameters

ppRecoContext
[out] A pointer that receives the recognition context interface pointer.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	*ppRecoContext* is invalid or bad.
FAILED(hr)	Appropriate error message.

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpRecognizer

The ISpRecognizer interface enables applications to directly control aspects of the speech recognition (SR) engine.

When to Use

Call methods of the ISpRecognizer interface to configure or retrieve the attributes of the SR engine.

Note: Not all functionality will be available in the shared instances.

Note: This interface inherits from ISpProperties.

Methods in Vtable Order

ISpRecognizer Methods	Description
SetRecognizer	Specifies an SR engine.
GetRecognizer	Retrieves an SR engine.
SetInput	Enables an application to specify which input stream the SR engine should use.
GetInputObjectToken	Retrieves the input token object for the stream.

GetInputObjectToken	Retrieves the input token object for the stream.
GetInputStream	Retrieves the input stream.
CreateRecoContext	Enables an application to create a recognition context for this instance of an SR engine.
GetRecoProfile	Retrieves a pointer to the recognition profile token.
SetRecoProfile	Sets the profile information of the recognition profile token.
IsSharedInstance	Determines if the SR engine is currently shared by other contexts.
GetRecoState	Retrieves the state of the recognition engine.
SetRecoState	Sets the state of the recognition engine.
GetStatus	Retrieves the current input status for the engine.
GetFormat	Retrieves the format information associated with the audio stream.
IsUISupported	Checks if the underlying tokens support the requested user interface.
DisplayUI	Displays the user interface from the underlying tokens.
EmulateRecognition	Emulates a recognition from a specified phrase rather than from spoken content.

[This is preliminary documentation and subject to change.]

ISpRecognizer::SetRecognizer

ISpRecognizer::SetRecognizer specifies a speech recognition engine.

```
HRESULT SetRecognizer(
   ISpObjectToken   *pEngineToken
);
```

Parameters

pEngineToken
[in] The desired speech recognition engine.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*pEngineToken* is invalid or bad.
SPERR_ALREADY_INITIALIZED	Interface is already initialized.
E_NOTIMPL	Method is not available in the shared instance.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpRecognizer::GetRecognizer

ISpRecognizer::GetRecognizer retrieves a speech recognition engine.

```
HRESULT GetRecognizer(
   ISpObjectToken   **ppEngineToken
);
```

Parameters

ppEngineToken
    [out] The retrieved speech recognition engine.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*ppEngineToken* is invalid or bad.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpRecognizer::SetInput

ISpRecognizer::SetInput enables an application to specify which input stream the SR engine should use.

If the engine is currently processing audio, this call will fail.

```
HRESULT SetInput(
   IUnknown  *pUnkInput,
   BOOL       fAllowFormatChanges
);
```

Parameters

pUnkInput
    [in] The stream object token.
fAllowFormatChanges
    [in] Boolean indicating an existing format may be converted if required. TRUE allows

[in] Boolean indicating an existing format may be converted if required. TRUE allows the format conversion; otherwise, FALSE.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*pUnkInput* is invalid or not a stream.
SPERR_ENGINE_BUSY	The current method can not be performed while a grammar rule is active.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpRecognizer::GetInputObjectToken

ISpRecognizer::GetInputObjectToken retrieves the input token object for the stream.

```
HRESULT GetInputObjectToken(
   ISpObjectToken   **ppToken
);
```

Parameters

ppToken
: [out] The input token pointer

Return values

Value	Description
S_OK	Function completed successfully.
S_FALSE	Function completed successfully, but there was no input or the input has no token.
E_POINTER	*ppToken* is invalid or bad.
E_NOTIMPL	Method is not available in the shared instance.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpRecognizer::GetInputStream

ISpRecognizer::GetInputStream retrieves the input stream.

```
HRESULT GetInputStream(
   ISpStreamFormat   **ppStream
);
```

Parameters

ppStream
[out] Address of a pointer to the ISpStreamFormat object that receives the input stream information.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	*ppStream* is invalid or bad.
SPERR_NOT_FOUND	*ppStream* is not initialized.
E_NOTIMPL	Method is not available in the shared instance.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpRecognizer::CreateRecoContext

ISpRecognizer::CreateRecoContext enables an application to create a recognition context for this instance of an SR engine.

```
HRESULT CreateRecoContext(
   ISpRecoContext   **ppNewContext
);
```

Parameters

ppNewContext
[out] Address of a pointer to an ISpRecoContext interface receiving the recognition context.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	*ppNewContext* is invalid or bad.
FAILED(hr)	Appropriate error message.

Examples Using This Method

SDK: Coffee0; Coffee1; Coffee2.

[This is preliminary documentation and subject to change.]

ISpRecognizer::GetRecoProfile

ISpRecognizer::GetRecoProfile retrieves a pointer to the recognition profile token.

```
HRESULT GetRecoProfile(
   ISpObjectToken    **ppToken
);
```

Parameters

ppToken
[out] Address of a pointer of an ISpObjectToken that receives the profile information.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpRecognizer::SetRecoProfile

ISpRecognizer::SetRecoProfile sets the profile information of the recognition profile token.

```
HRESULT SetRecoProfile(
   ISpObjectToken    *pToken
);
```

Parameters

pToken
[in] Address of an ISpObjectToken object that contains the profile information

Return values

Value	Description
S_OK	Function completed successfully.

S_OK	Function completed successfully.
FAILED(hr)	Appropriate error message.
E_INVALIDARG	One or more arguments are invalid.

[This is preliminary documentation and subject to change.]

ISpRecognizer::IsSharedInstance

ISpRecognizer::IsSharedInstance determines if the SR engine is currently shared by other contexts.

```
HRESULT  IsSharedInstance  ( void );
```

Parameters

None.

Return values

Value	Description
S_OK	Indicates that this instance of the recognition engine is being shared.
S_FALSE	Indicates that this instance of the recognition engine is not being shared.

[This is preliminary documentation and subject to change.]

ISpRecognizer::GetRecoState

ISpRecognizer::GetRecoState retrieves the current state of the recognition engine.

```
HRESULT GetRecoState(
   SPRECOSTATE   *pState
);
```

Parameters

pState
: [out] One of the input state flags contained in the SPRECOSTATE enumeration.

Return values

Value	Description

S_OK	Function completed successfully.
E_POINTER	Invalid pointer.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpRecognizer::SetRecoState

ISpRecognizer::SetRecoState sets the state of the recognition engine.

```
HRESULT SetRecoState(
   SPRECOSTATE   NewState
);
```

Parameters

NewState
[in] One of the flags contained in the SPRECOSTATE enumeration.

Return values

Value	**Description**
S_OK	Function completed successfully.
FAILED(hr)	Appropriate error message.
E_INVALIDARG	One or more arguments are invalid.

[This is preliminary documentation and subject to change.]

ISpRecognizer::GetStatus

ISpRecognizer::GetStatus gets the current input status for the engine.

```
HRESULT GetStatus(
   SPRECOGNIZERSTATUS   *pStatus
);
```

Parameters

pStatus
[out] The current input status of the engine.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	*pStatus* is invalid or bad.

[This is preliminary documentation and subject to change.]

ISpRecognizer::GetFormat

ISpRecognizer::GetFormat retrieves the format information associated with the audio stream.

```
HRESULT GetFormat(
   SPSTREAMFORMATTYPE   WaveFormatType,
   GUID                *pFormatId,
   WAVEFORMATEX       **ppCoMemWFEX
);
```

Parameters

WaveFormatType
[in] One of the wave file format types specified in SPSTREAMFORMATTYPE.
pFormatId
[out] The address of the unique identifier associated with the format type.
ppCoMemWFEX
[out] Address of a pointer to a WAVEFORMATEX structure that receives the format information.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	Invalid pointer.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpRecognizer::IsUISupported

ISpRecognizer::IsUISupported checks if the underlying tokens support the requested UI.

```
[local] HRESULT IsUISupported(
   const WCHAR   *pszTypeOfUI,
   void          *pvExtraData,
   ULONG          cbExtraData,
   BOOL          *pfSupported
);
```

Parameters

pszTypeOfUI
   [in] Address of a pointer to a null-terminated string containing the UI type information.
pvExtraData
   [in] Additional information for the call.
cbExtraData
   [in] Size, in bytes, of *pvExtraData*.
pfSupported
   [out] Address of a variable that receives the value indicating support for the interface. This value is set to TRUE when this interface is supported; otherwise set to FALSE.

Return values

Value	**Description**
S_OK	Function completed successfully.
E_INVALIDARG	*pfSupported* is invalid or bad.
FAILED(hr)	Appropriate error message.

ISpRecognizer::DisplayUI

ISpRecognizer::DisplayUI displays the UI from the underlying tokens.

```
[local] HRESULT DisplayUI(
   HWND           hwndParent,
   const WCHAR   *pszTitle,
   const WCHAR   *pszTypeOfUI,
   void          *pvExtraData,
   ULONG          cbExtraData
);
```

Parameters

hwndParent
   [in] Specifies the handle of the parent window.
pszTitle
   [in] Address of a null-terminated string containing the window title.
pszTypeOfUI
   [in] Address of a null-terminated string containing the UI type information.
pvExtraData
   [in] Additional information for the call.
cbExtraData
   [in] Size, in bytes, of the contents of *pvExtraData*.

Return values

Value	Description
S_OK	Function completed successfully.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpRecognizer::EmulateRecognition

ISpRecognizer::EmulateRecognition emulates a recognition from a specified phrase rather than from spoken content. This method generates a recognition event only if the entire sentence parsed.

```
HRESULT EmulateRecognition(
   ISpPhrase   *pPhrase
);
```

Parameters

pPhrase
[in] The phrase to emulate.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	*ppCoMemPhrase* is invalid or bad.
SPERR_UNINITIALIZED	Phrase is uninitialized.
E_OUTOFMEMORY	Exceeded available memory.
FAILED(hr)	Appropriate error message.

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpPhrase

Methods in Vtable Order

ISpPhrase Methods	**Description**

GetPhrase	Retrieves data elements associated with a phrase.
GetSerializedPhrase	Retrieves a memory block containing all of the data for this phrase.
GetText	Retrieves elements from a text phrase.
Discard	Discards the requested data from an individual element.

[This is preliminary documentation and subject to change.]

ISpPhrase::GetPhrase

ISpPhrase::GetPhrase retrieves data elements associated with a phrase.

```
HRESULT GetPhrase(
   SPPHRASE    **ppCoMemPhrase
);
```

Parameters

ppCoMemPhrase
[out] Address of a pointer to a SPPHRASE data structure receiving the phrase information. May be NULL if no phrase is recognized. If NULL, no memory is allocated for the structure.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	Invalid pointer.
E_OUTOFMEMORY	Exceeded available memory.

Note:

Returned data includes all elements associated with this phrase.

[This is preliminary documentation and subject to change.]

ISpPhrase::GetSerializedPhrase

ISpPhrase::GetSerializedPhrase passes back a memory block containing all of the data for this phrase.

This is a serialized version of SPPHRASE. It allocates a continuous block of memory and uses offsets instead of pointers and fills in the block. It also reports the total number of bytes it occupies after serialization in SPSERIALIZEDPHRASE. This allows the text to be written to the disk safely. However, make a critical section lock for the phrase object before making this call.

```
HRESULT GetSerializedPhrase(
   SPSERIALIZEDPHRASE    **ppCoMemPhrase
;)
```

Parameters

ppCoMemPhrase
    [out] Address of a pointer to a SPSERIALIZEDPHRASE data structure receiving the phrase information.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	*ppCoMemPhrase* is invalid or bad.
SPERR_UNINITIALIZED	Phrase is uninitialized.
E_OUTOFMEMORY	Exceeded available memory.

[This is preliminary documentation and subject to change.]

ISpPhrase::GetText

ISpPhrase::GetText retrieves elements from a text phrase.

```
HRESULT GetText(
   ULONG     ulStart,
   ULONG     ulCount,
   BOOL      fUseTextReplacements,
   WCHAR   **ppszCoMemText,
   BYTE     *pbDisplayAttributes
);
```

Parameters

ulStart
    [in] Specifies the first element in the text phrase.
ulCount

[in] Specifies the number of elements to retrieve from the text phrase.

fUseTextReplacements
[in] Boolean value that indicates if replacement text should be used.

ppszCoMemText
[out] Address of a pointer to the data structure that contains the display text information.

pbDisplayAttributes
[out] Address of the SPDISPLAYATTRIBUTES enumeration that contains the text display attribute information.

Return values

Value	**Description**
S_OK	Function completed successfully.
S_FALSE	A phrase that does not contain text or *ppszCoMemText* is NULL.
E_INVALIDARG	One or more arguments are invalid.
E_POINTER	Invalid pointer.
E_OUTOFMEMORY	Exceeded available memory.

[This is preliminary documentation and subject to change.]

ISpPhrase::Discard

ISpPhrase::Discard discards the requested data from an individual element.

This function sets the string pointers to NULL but does not reallocate the structure.

```
ULONG Discard(
   DWORD    dwValueTypes
;)
```

Parameters

dwValueTypes
[in] Flags of type SPVALUETYPE must be one or a combination of the following values:

Value	**Description**
SPDF_DISPLAYTEXT	Removes the display text.
SPDF_LEXICALFORM	Removes the lexicon from text.
SPDF_PRONUNCIATION	Removes the pronunciation text.

Return value

The number of characters discarded.

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpPhraseAlt

Note: The ISpPhraseAlt interface inherits from ISpPhrase.

Methods in Vtable Order

ISpPhraseAlt Methods	Description
GetAltInfo	Retrieves data elements associated with an alternate phrase.
Commit	Replaces the section of the phrase that presents the best match to this alternate phrase with the contents of the alternate phrase.

[This is preliminary documentation and subject to change.]

ISpPhraseAlt::GetAltInfo

ISpPhraseAlt::GetAltInfo retrieves data elements associated with an alternate phrase.

```
HRESULT GetAltInfo(
   ISpPhrase    **ppParent,
   ULONG         *pulStartElementInParent,
   ULONG         *pcElementsInParent,
   ULONG         *pcElementsInAlt
);
```

Parameters

ppParent
Address of a pointer to the ISpPhrase object receiving the alternate text phrase information.

pulStartElementInParent
Value that receives the first element in the text phrase of the parent object.

pcElementsInParent
Value that receives the total number of text phrase elements in the parent object.

pcElementsInAlt
Value that receives the total number of elements associated with the alternate text phrase.

Return values

Value	Description
S_OK	Function completed successfully.

E_POINTER	*ppvObject* is invalid or bad.
E_INVALIDARG	One of the parameters is invalid or bad.
SPERR_NOT_FOUND	One of the interfaces is invalid or bad.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpPhraseAlt::Commit

ISpPhraseAlt::Commit replaces the section of the phrase that presents the best match to this alternate phrase with the contents of the alternate phrase.

When the best phrase is subsequently received from the result object instance, the updated phrase will be returned rather than the phrase originally chosen by the recognizer. This method also updates the generation identifier of the phrase.

```
HRESULT Commit ( void );
```

Parameters

None

Return values

Value	Description
S_OK	Function completed successfully.
SPERR_NOT_FOUND	One of the interfaces is invalid or bad.
FAILED(hr)	Appropriate error message.

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpProperties

ISpProperties sets and retrieves property attribute information.

Methods in Vtable Order

ISpProperties Methods	Description
SetPropertyNum	Sets the numeric attribute property information of the

	recognition engine.
GetPropertyNum	Retrieves the numeric attribute property information of the recognition engine.
SetPropertyString	Sets the text attribute property information of the recognition engine.
GetPropertyString	Retrieves the text attribute property information of the recognition engine.

[This is preliminary documentation and subject to change.]

ISpProperties::SetPropertyNum

ISpProperties::SetPropertyNum sets the numeric attribute property information of the recognition engine.

```
HRESULT SetPropertyNum(
   const WCHAR   *pName,
   LONG           lValue
 );
```

Parameters

pName
  [in] Address of the string containing the property attribute name information.
lValue
  [in] Address of the value containing the property attribute value information.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.
E_POINTER	Invalid pointer.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpProperties::GetPropertyNum

ISpProperties::GetPropertyNum retrieves the recognition engine numeric attribute property information.

```
HRESULT GetPropertyNum(
   const WCHAR   *pName,
   LONG          *plValue
);
```

Parameters

pName
  [in] Address of the string containing the property attribute name information.

plValue
  [out] Address of the value that receives the property attribute value information.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.
E_POINTER	Invalid pointer.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpProperties::SetPropertyString

ISpProperties::SetPropertyString sets the text attribute property information of the recognition engine.

```
HRESULT SetPropertyString(
   const WCHAR   *pName,
   const WCHAR   *pValue
);
```

Parameters

pName
  [in] Address of a string containing the property name information.

pValue
  [in] Address of a string containing the property value information.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpProperties::GetPropertyString

ISpProperties::GetPropertyStringretrieves recognition engine text attribute property information.

```
HRESULT GetPropertyString(
   const WCHAR   *pName,
   WCHAR          **ppCoMemValue
);
```

Parameters

pName
   [in] Address of a string containing the property name information.
ppCoMemValue
   [out] Address of the string that receives the property attribute value information. The caller must call CoTaskMemFree() to free the string pointer.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.
FAILED(hr)	Appropriate error message.

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

SAPI Text to Speech

The following section covers:

- Overview
- Introduction
- Text synthesis
- ISpVoice

[This is preliminary documentation and subject to change.]

Overview

Overview

The following section covers:

- What is text to speech?
- Why use text to speech?

What is text to speech?

Text to speech (TTS) is a process through which text is rendered as digital audio and then "spoken." Most TTS engines can be categorized by the method they use to translate phonemes into audible sound.

- Concatenated word
- Synthesis
- Subword concatenation

Concatenated word:
Although concatenated word systems are not really synthesizers, they are one of the most commonly used text–to–speech system implementations. In a concatenated word engine, the application designer provides recordings for phrases and individual words. The engine concatenates the recordings together in order to form one spoken sentence or phrase. A voice–mail system most likely uses a concatenated word engine. For example, "You have three new messages." In this example, the engine has recordings for "You have", + all of the digits, + "new messages" to form the voice mail interaction phrase.

Synthesis:
A text–to–speech engine uses synthesis to generate sounds similar to those created by the human vocal cords and applies various filters to simulate throat length, mouth cavity, lip shape, and tongue position. The voice produced by synthesis technology tends to sound less human than a voice produced by diphone concatenation, but it is possible to obtain different voice qualities by changing a few parameters.

Subword concatenation:
A text–to–speech engine uses subword concatenation to link short digital–audio segments together and performs inter–segment smoothing to produce a continuous sound. In diphone concatenation for example, each segment consists of two phonemes, one that leads into the sound and one that finishes the sound. Thus, the word "hello" consists of the phonemes, h – eh – l – oe. The corresponding subword segments are silence–h – h–eh – eh–l – l–oe – oe–silence. Subword segments are created by recording many hours of a human voice and carefully identifying the beginning and ending of phonemes. Although this technique can produce a more realistic voice, it takes a considerable amount of work to create a new voice and the voice is not easily localizable, as the phonemes are specific to the speaker's language.

Back to top

Why use text to speech?

Text to speech (TTS) should be used to audibly communicate information to the user, when digital audio recordings are inadequate. Generally, text to speech is better than audio recordings when:

- Audio recordings are too large to store on disk or too expensive to record.
- Audio recording is not possible, as the application doesn't know ahead of time what it will speak.

Text to speech also offers a number of benefits. In general, text to speech is most useful for short phrases or for situations when prerecording is not practical. Text to speech has the following practical uses:

- Reading dynamic text
- Proofreading
- Conserving storage space
- Notifying the user of events
- Providing audible feedback

Reading dynamic text:
Text to speech is useful for phrases that vary too much to record and store each possible alternative. For example, speaking the time is a good use for text to speech, because the effort and storage involved in concatenating all possible times is manageable.

Proofreading:
Audible proofreading of text and numbers helps catch typing errors missed by visual proofreading.

Conserving storage space:
Text to speech is useful for phrases that would occupy too much storage space if they were prerecorded in digital–audio format.

Notifying the user of events:
Text to speech works well for informational messages. For example, to inform the user that a print job is complete, an application could say "printing complete" rather than displaying a message box and requiring the user to click the OK button.
Note: This should be used for noncritical notifications, as the user may have turned off the computer's sound, or may be physically out of hearing range.

Providing audible feedback:
Text to speech can provide audible feedback when visual feedback is inadequate or impossible. For example, the user's eyes might be busy with another task, such as transcribing data from a paper document. Users who have low vision could be reliant on text to speech as primary feedback mechanism from the computer.

Back to top

[This is preliminary documentation and subject to change.]

Introduction

The following section covers:

- Introducing the text-to-speech architecture
- Text-to-speech implementation considerations
- Application design considerations

Introducing the text-to-speech architecture

SAPI 5.0 compliant applications use the ISpVoice interface methods to access and control the text-to-speech features.

The ISpVoice interface Speak method is used to create the synthesized output of the engine.

SAPI 5.0 compliant applications can speak synchronously or asynchronously. It is possible to have the speak call speak text files and mix TTS synthesis text with audio files. Applications select text-to-speech voices by implementing the ISpVoice interface SetVoice method.

SAPI 5.0 enables the Extensible Markup Language (XML) to configure the settings for state of the voice (characteristics such as rate, pitch, and speed). Applications can use XML when calling the ISpVoice interface Speak method. Voices can be assigned different priorities using the ISpVoice::SetPriority, and voices with a higher priority will interrupt a voice with a lower priority. Additional information about SAPI 5.0 XML tagging is located at Text synthesis.

Application drivers for the SAPI speech synthesis (text to speech) engine implement the ISpTTSEngine interface. The primary method called by SAPI to perform speech rendering is ISpTTSEngine::Speak. SAPI, rather than the engine, performs XML parsing of the input text stream. The engine's Speak method is handed a linked list of text fragments with their associated XML attribute states. The Speak method also receives a pointer to the ISpVoice's ISpTTSEngineSite interface. The TTS engine uses this interface to queue events and to write output data.

Although SAPI 5.0 is a free-threaded architecture, instances of the TTS engine will always be called by SAPI on a single thread. TTS engines are never directly accessed by applications.

Back to top

09751836 . 122600

Text-to-speech implementation considerations

The following section covers:

- Text-to-speech voice quality
- Creating and localizing text-to-speech voices
- Registering text-to-speech voices

Text-to-speech voice quality

Most text-to-speech (TTS) engines can render individual words successfully. However, as soon as the engine speaks a sentence, it is easy to identify the voice as synthesized because it lacks human prosody (i.e., the inflection, accent, and timing that is commonly present in human speech communications.) For this reason, text-to-speech voices are often difficult to listen to and require concentration to understand, especially for more than a few words at a time.

Some TTS engines allow an application to define TTS segments with human prosody attached, making the synthesized voice much clearer. The engine provides this capability by pre-recording a human voice and allowing the application developer to transfer its intonation and speed to the text being spoken.

In effect, this acts as a highly effective voice compression algorithm. Although text with prosody attached requires more storage than ASCII text (approximately 1 kilobyte per minute compared to a few hundred bytes per minute), it requires considerably less storage than pre-recorded speech, which requires at least 30 kilobytes per minute. The following list of TTS factors also influence the quality of a synthesized voice:

- **Emotion:**
  Although many TTS engines can parse and interpret punctuation, such as periods, commas, exclamation points, and questions, none of the engines that are currently available can render the sound of human emotion.

- **Mispronunciation:**
  Text-to-speech engines use a set of pronunciation rules to translate text into phonemes. This is fairly easy for languages with phonetic alphabets, but it is very difficult for the English language, especially if last names are to be pronounced correctly. (Pronunciation rules seldom fail on common words, but often yield unsuccessful results on names that are unusual or of non-English origin.)

Creating and localizing text-to-speech voices

Creating a new voice for an engine that uses synthesis can be done relatively quickly by altering a few parameters of an existing voice. Although the pitch and timbre of the new voice are different, it uses the same speaking style and prosody rules as the existing voice.

Creating a new voice for a TTS engine that uses diphone concatenation can take a considerable amount of work. This is because the diphones must be acquired by recording a human voice and identifying the beginning and ending of phonemes, which are specific to the speaker's language.

Whether a text-to-speech engine uses synthesis or diphone concatenation, the work of localizing an engine for a new language requires a skilled linguist to design pronunciation and prosody rules and reprogram the engine to simulate the sound of the language's phonemes. In addition, diphone concatenation systems require a new voice to be constructed for the new language. As a result, most engines support only five to ten major languages.

Registering text-to-speech voices

In order to register a new voice, the user will need to specify the CLSID (Class ID). This specifies the object that is created when the ISpVoice object is created. For example, this could be the engine in the text-to-speech development environment.

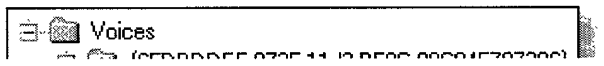
In the registry, the Microsoft TTS Voices have a VoiceData and a VoiceDef field. These are proprietary fields that are specific to the Microsoft engine and define where the voice data are located. These can be changed to company specific proprietary names. These values are accessible from the engine upon creation using the SetObjectToken method.

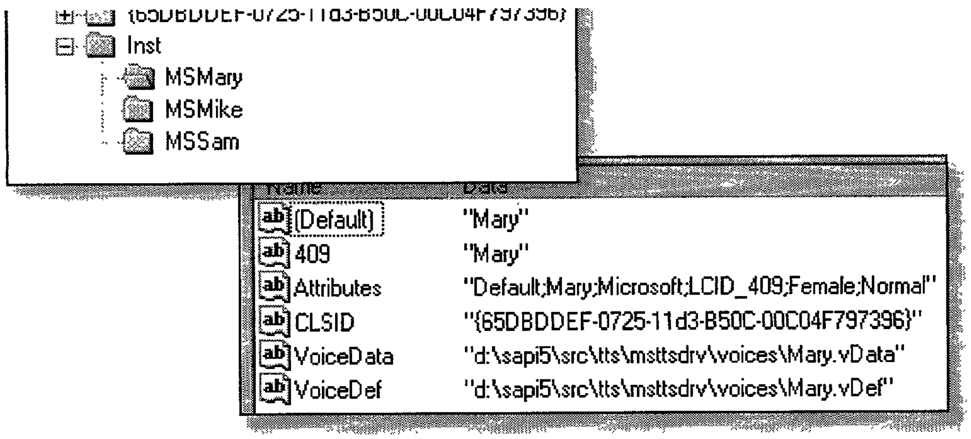
The Attributes field contains information associated with the TTS engine. However, in the SAPI 5.0 release the properties of this field have not been completely defined. It is important that the word "Default" appear as one of the registered voices. Microsoft has not specified the type of information, or the format of this field. Thus, all information associated with this field is subject to change in a future release. The locale name (LCID) of the voice is 409 and is intended for UI purposes only.

Engine developers are required to register the voices for their engine and include the following four fields in the registry:

1. **Default** The default voice for the engine.
2. **409** The engine name as displayed in the locale identifier (LCID).
3. **Attributes** The text string containing the TTS engine voice information.
4. **CLSID** The class identifier (CLSID) for the TTS engine.

While it is possible to store other engine specific information within the registry, the above entries are required.





Name	Data
(Default)	"Mary"
409	"Mary"
Attributes	"Default;Mary;Microsoft;LCID_409;Female;Normal"
CLSID	"{65DBDDEF-0725-11d3-B50C-00C04F797396}"
VoiceData	"d:\sapi5\src\tts\msttsdrv\voices\Mary.vData"
VoiceDef	"d:\sapi5\src\tts\msttsdrv\voices\Mary.vDef"

An example of the Microsoft TTS engine registries are shown above:

Back to top

Application design considerations

The following section covers:

- Using text to speech for short phrases
- Presenting important information visually
- Avoiding a mix of text to speech and recorded voice
- Making text to speech optional

Using text to speech for short phrases

An application should use text to speech only for reading short phrases or notifications, not long passages of text. Listening to a synthesized voice read more than a few sentences requires more concentration and a user can become distracted.

Presenting important information visually

An application should communicate critical information visually as well as audibly, and it should not rely solely on text to speech to communicate important information. The user can miss spoken messages for a variety of reasons, such as not having speakers or headphones attached to the computer, being distracted, or being physically away from the computer when the application speaks. Or the user may have simply turned off text to speech.

Avoiding a mix of text to speech and recorded voice

The synthesized voice provided by even the best text-to-speech engine is noticeably different from that provided by a digital-audio recording. Mixing the two in the same utterance can be disturbing to the user and usually makes the text-to-speech voice sound worse by comparison. For example, to have an application speak "The number is 56,738," the user should not prerecord "The number is" then use text to speech to speak the numbers. Everything should be either prerecorded or text to speech.

Making text to speech optional

Applications should enable the user to turn off the text-to-speech feature. Some users work in environments where audible speech or sound eminating from a computer could distract coworkers. Additionally, it may be undesirable to audibly share computer information with others in the work environment.

Back to top

with SAPI 5.0

[This is preliminary documentation and subject to change.]

Text synthesis

SAPI 5.0 utilizes the Extensible Markup Language (XML) to define text synthesis characteristics and application configuration settings.

A text–to–speech (TTS) engine that uses synthesis generates sounds similar to those created by the human voice and applies various filters to simulate throat length, mouth cavity, lip shape, and tongue position. Although the voice produced through text synthesis often sounds less human than a voice produced by diphone concatenation, it is possible to obtain different qualities of voice through modifying TTS configuration settings. SAPI 5.0 compliant TTS engines can achieve improved synthesized text–to–speech voice qualities using XML to control the configuration settings for text synthesis.

The following section covers:

- Synthesis markup
- Scope of XML elements
- Context tag definition

[This is preliminary documentation and subject to change.]

Synthesis markup

SAPI 5.0 synthesis markup is the collection of XML tags inserted into text to modify the speech synthesis of that text. These XML tags, which provide functionality such as volume control and word emphasis, are inserted into text passed into ISpVoice::Speak and text streams of format SPDFID_XML which are then passed into ISpVoice::SpeakStream. Please see ISpVoice for more information.

SAPI 5.0 synthesis markup is an application of XML. Every XML element consists of a start tag <Some_tag> and an end tag </Some_tag> with a case-sensitive tag name and contents between these tags. If the element is empty, it has no contents <Some_tag></Some_tag> and the start tag and the end tag might be the same <Some_tag/>. More information about XML and the XML specification is available at: http://www.w3.org/TR/1998/REC-xml-19980210.html.

The following section covers:

- SAPI 5.0 XML tags
- Attributes
- Contents
- Comments
- Relationship to HTML web pages and SABLE

SAPI 5.0 XML tags

SAPI 5.0 XML tags

XML tags in SAPI 5.0 follow a defined structure program scope and implementation. SAPI 5.0 XML tags have a specific purpose and affect the input text in a predetermined manner.

The SAPI 5.0 XML tags are divided into four different scope categories.

1. Non-scoped
2. Scoped
3. Global
4. Scoped/Global

The behavior and application-specific properties can be controlled through the use of XML tags. Additional information on SAPI 5.0 XML elements is available at: Scope of XML elements.

Attributes

Attributes of an XML element appear inside the start tag. Each attribute is in the form of a name, followed by an equal character, followed by a quoted string value. An attribute of a given name may only appear once in a start tag. Exact details on what characters may appear between quotes can be found at http://www.w3.org/TR/REC-xml#NT-AttValue.

Briefly, the literal string cannot contain a less than character "<" if the string is surrounded by single quotation marks, it cannot contain a single quotation mark. If the string is surrounded by double quotation marks it cannot contain a double quotation mark. Furthermore, all ampersands (&) can be used only in an entity reference such as &amp; and "&gt;". When a literal string is parsed, the resulting replacement text will resolve all entity references such as "&gt;" into its corresponding text, such as ">".

In this specification, only the resulting replacement text needs to be defined for attribute value strings. The XML specification defines the exact file syntax details. Character references allow entity references in ASCII characters to specify replacement text which has unprintable characters such as extended UNICODE characters. The entity reference "&#x0259;" specifies the single UNICODE character for the International Phonetic Alphabet symbol for a mid-central unrounded vowel. See http://www.w3.org/TR/1998/REC-xml-19980210#sec-references for details.

Contents

The contents of an element consist of text or sub-elements. With these definitions, the XML specification defines the exact file syntax details.

Comments

Comments of the form <!-- my comment --> are supported. More information about comments and the XML specification is available at: http://www.w3.org/TR/REC-xml#sec-comments.

Relationship to HTML web pages and SABLE

The XML format that SAPI 5.0 uses is NOT placed inside web pages. Web page authors who want to mark up sections of HTML text so that it is synthesized correctly, should use the W3C Aural Cascading Style Sheets (ACSS). More information is available at: http://www.w3.org/TR/WD-acss

SAPI applications that are synthesizing text from a web page will "render" HTML+ACSS into SAPI's synthesis markup format. Programs apply a default ACSS file when synthesizing web pages that do not have an associated ACSS file.

SAPI 5.0 synthesis markup format is similar to the format published by the SABLE Consortium. However, this format and SABLE version 1.0 are not interoperable. At this time, it's not determined if they will become partially interoperable in the future. More information about the SABLE specification is available at: http://www.bell-labs.com/project/tts/sable.html.

Back to top

[This is preliminary documentation and subject to change.]

Scope of XML elements

SAPI Synthesis markup XML elements (tags) fall into one of four scope categories:

1. **Non-scoped** – an element which must be empty and does not directly affect the synthesis of input text around it.

   Valid tag formats are: <TAG/>

2. **Scoped** – an element that contains input text, possibly zero-length, and only directly affects the input text that it contains. If this element is empty, it only directly affects the zero-length string it contains.

   Valid tag formats are: <TAG>,<TAG/>

3. **Global** – an element which is empty and directly affects the rest of the input text following it in the input stream.

   Valid tag formats are: <TAG/>

4. **Scoped/Global** – an element that can be used in either a scoped or global manner.

   Valid tag formats are: <TAG/>,<TAG>,</TAG>

The following table describes the synthesis markup elements/tags which are functional across all SAPI compliant synthesis engines:

Element	Scope	Attributes	Description
BOOKMARK	Non-scoped	MARK	Inserts a bookmark.
SILENCE	non-scoped	MSEC	Inserts silence for a specified number of milliseconds.
EMPH	Scoped	None	Places emphasis on words.
SPELL	Scoped	None	Spells out words letter by letter.
PRON	Scoped/Non-	SYM	Pronounces according to International

	scoped		Phonetic Alphabet.
SAPI	Scoped	None	Indicates to the XML parser that the XML tags contained within the scope should be parsed as SAPI tags.
LANG	Scoped/Global	LANGID	Language/locale of contained text.
PARTOFSP	Scoped	PART	Part of speech of contained word(s).
VOICE	Scoped/Global	REQUIRED, OPTIONAL	Sets which voice implementation is used for synthesis.
RATE	Scoped/Global	SPEED, ABSSPEED	Sets the relative adjustment for speaking speed of synthesized speech.
VOLUME	Scoped/Global	LEVEL	Sets the volume of synthesized output.
PITCH	Scoped/Global	MIDDLE, ABSMIDDLE	Sets the relative pitch adjustment of synthesized speech.
CONTEXT	Scoped	Type	Context of the text that is being parsed.

Guaranteed XML Elements

BOOKMARK

Inserts a bookmark into the input stream using the bookmark element. If an application specifies interest in bookmark events, it will receive an event when synthesis has passed this element in an input stream. If the audio output destination supports handling of events, then an application will receive this event once the synthesized speech up to this bookmark has been output. Otherwise, an application receives a bookmark event when the voice implementation has synthesized speech up to this bookmark.

MARK
The value of a bookmark may be any string or integer.

Back to top

SILENCE

Produces silence for a specified number of milliseconds to the output audio stream.

MESC
Number of milliseconds, from zero to 65535, of silence. Value entries that exceed this range should be limited to 65535. Value entries that are below this range (negative values) should be set to zero.

Back to top

EMPH

Places emphasis on the words contained by this element.

Back to top

SPELL

Spells out words letter by letter contained by this element.
Note: The engine should not normalize the text scoped in the SPELL tag. This includes numbers, words, etc. Words that contain punctuation, such as "U.S.A." should spell out the letters as well as the punctuation scoped within the tag.

Back to top

PRON

Pronounces the contained text (possibly empty) according to the provided Unicode string.
See American English Phoneme Representation for more information.

SYM
String representing a phoneme for a language supported by the voice implementing synthesized speech.

Back to top

SAPI

At the beginning of the SAPI tag, the state of the voice is the same state as the insertion point of the SAPI tag. At the close of the SAPI tag, the voice returns to the same state as that of the insertion point. SAPI tags may be nested. When a nested SAPI tag is closed, the voice state returns to what it was at the insertion point of the nested tag.

Back to top

LANG

Changes the LANGID of the scoped text. When the LANGID is changed, SAPI will try to detect if the current voice can handle the new language.

If voice does not speak the specified language, then an engine must choose another language it speaks as a best attempt. Using the VOICE tag and REQUIRED attribute, this fall back path can be prevented if not desirable.

LANGID
Language identifier.

Back to top

PARTOFSP

The part of speech of contained word(s). The PARTOFSP tag is used to force a particular pronunciation of a word (for example, the word record as a *noun* versus the word record as a *verb*).

PART
String name of part of speech. Following are valid parts of speech:

- noun
- verb
- modifier
- function
- interjection
- abbreviation
- unknown

Back to top

VOICE

Sets which voice implementation is used for synthesis of associated input stream text. If the user specifies a voice ID, then a specific voice implementation will be selected, otherwise the best voice implementation given the required and optional attributes will be selected by SAPI.

ID
The progID (class ID) of a component supporting the ISpTTSEngine interface that provides a voice implementation. This attribute takes precedence over the REQUIRED/OPTIONAL attributes if used together. If the specific voice progID is not found on the system, the XML parser will do a best match based on the REQUIRED/OPTIONAL attributes. If these attributes are not specified, the XML parser uses the default voice.

REQUIRED
The XML parser selects the first voice registered containing all of the specified attributes. A string that contains semicolon-delimited sub-strings is used to specify the attributes. The speak call will fail if the parser cannot find the required tags.

The following are required attributes:

- name
- age group
- vendor
- language
- gender
- CLSID

OPTIONAL
The XML parser selects the first voice registered containing all of the REQUIRED attributes, and has the best match to the specified OPTIONAL attributes. Optional attribute importance is specified by the order that they appear in the string. The first sub-string is the most important. A string that contains semicolon-';'delimited sub-strings is used to specify the optional attributes.

The optional attributes are:

- name
- age group
- vendor
- language
- gender
- CLSID
- description

⩓ Back to top

VOLUME, PITCH, RATE

The scoped/global elements, VOLUME, RATE and PITCH respectively, modify the underlying numerical values of a speech block. Relative attribute values, those preceded by a dash (-) or a plus sign (+), increment the underlying numerical value by the specified amount.
For VOLUME, the underlying value can never be below zero or exceed 100. All negative value entries will result in zero and all values above 100 will result in 100. VOLUME may also receive an absolute value (no '-' or '+' character) of an integer between zero and 100. For PITCH and RATE, SAPI compliant engines have the option of supporting only the guaranteed range of values and behaving as -10 for adjustments below -10 and behaving as +10 for values above +10.

09754835.122600

Element	Attribute	Valid Strings	Guaranteed Range
VOLUME	LEVEL	"N"	0 to 100 (no overflow allowed)
PITCH	MIDDLE	"-N" or "+N"	-10 to 10 (overflow allowed)
RATE	SPEED	"-N" or "+N"	(overflow allowed)

Back to top

VOLUME
Set the volume of synthesized output.

LEVEL
Specifies the volume as percent of the maximum volume of the current voice. Each voice implementation has its own maximum volume. This value must be between zero and 100 inclusive.

Back to top

PITCH
Sets the relative pitch adjustment of synthesized speech.

MIDDLE
The value can range from -10 to +10. A value of zero sets a voice to speak at its default pitch. A value of -10 sets a voice to speak at three fourths (or 3/4) of its default pitch. A value of +10 sets a voice to speak at four thirds (or 4/3) of its default pitch. Each increment between -10 and +10 is logarithmically distributed such that incrementing/decrementing by one is multiplying/dividing the pitch by the 24th root of two (about 1.03). Values more extreme than -10 and +10 will be passed to an engine, but SAPI 5.0 compliant engines may not support such extremes and instead may clip the pitch to the maximum or minimum pitch it supports. Values of -24 and +24 must lower and raise pitch by one octave respectively. All incrementing/decrementing by one must multiply/divide the pitch by the 24th root of two. When scoped, this attribute is relative.

The following is an example of the <PITCH> tag and the MIDDLE attribute.

```
<SAPI>Pitch adjustment zero,
   <PITCH MIDDLE="-3">pitch adjustment -3,
      <PITCH MIDDLE="-3">pitch adjustment -6,</PITCH>
   back to adjustment -3,
   </PITCH>
and back to adjustment zero, the default pitch.
</SAPI>
```

ABSMIDDLE

The value can range from -10 to +10. A value of zero sets a voice to speak at its default pitch. A value of -10 sets a voice to speak at three-fourths (or 3/4) of its default pitch. A value of +10 sets a voice to speak at four-thirds (or 4/3) of its default pitch. Each increment between -10 and +10 is logarithmically distributed such that incrementing/decrementing by one is multiplying/dividing the pitch by the 24th root of two (about 1.03). Values more extreme than -10 and 10 will be passed to an engine but compliant engines may not support such extremes and instead may clip the pitch to the maximum or minimum pitch it supports. Values of -24 and +2SAPI 54 must lower and maximum or minimum pitch it supports. Values of -24 and +2SAPI 54 must lower and raise pitch by one octave respectively. All incrementing/decrementing by one must multiply/divide the pitch by the 24th root of two. When scoped, this attribute is absolute.

The following is an example of the <PITCH> tag and the ABSMIDDLE attribute.

```
<SAPI>Pitch adjustment zero,
        <PITCH ABSMIDDLE="-3">pitch adjustment -3,
                <PITCH ABSMIDDLE ="-3">pitch adjustment -3,
                </PITCH>
        back to adjustment -3,
        </PITCH>
and back to adjustment zero, the default pitch.
</SAPI>
```

⩯ Back to top

RATE

Sets the relative speed adjustment at which words are synthesized.

SPEED
The value can range from -10 to +10. A value of zero sets a voice to speak at its default rate. A value of -10 sets a voice to speak at one-third of its default rate. A value of +10 sets a voice to speak at three times its default rate. Each increment between -10 and +10 is logarithmically distributed such that incrementing/decrementing by one is multiplying/dividing the rate by the tenth root of three (about 1.12). Values more extreme than -10 and +10 will be passed to an engine but SAPI 5.0 compliant engines may not support such extremes and instead may clip the rate to the maximum or minimum rate it supports.

The following is an example of the <RATE> tag and the SPEED attribute:

```
<SAPI>Rate adjustment zero,
        <RATE SPEED="-3">rate adjustment -3,
                <RATE SPEED="-4">rate adjustment -7,
                </RATE>
        back to adjustment -3,
        </RATE>
and back to adjustment zero, the default rate.
</SAPI>
```

ABSSPEED
The value can range from -10 to +10. A value of zero sets a voice to speak at its default rate. A value of -10 sets a voice to speak at one-third (or 1/3) of its default rate. A value of +10 sets a voice to speak at three times its default rate. Each increment between -10 and +10 is logarithmically distributed such that incrementing/decrementing by one is multiplying/dividing the rate by the 10th root of three (about 1.12). Values more extreme than -10 and +10 will be passed to an engine, but SAPI 5.0 compliant engines may not support such extremes and instead may clip the rate to the maximum or minimum rate it supports. When scoped, this attribute is absolute.

The following is an example of the <RATE> tag and the ABSSPEED attribute:

```
<SAPI>Rate adjustment zero,
        <RATE ABSSPEED="-3">rate adjustment -3,
                <RATE ABSSPEED="-4">rate adjustment -4,
                </RATE>
        back to adjustment -3,
        </RATE>
```

```
and back to adjustment zero, the default rate.
</SAPI>
```

⮝ Back to top

CONTEXT

Context specifies the type of normalization rules which to apply to the scoped text. SAPI does not guarantee any predefined contexts. For additional information, please see Context tag definition.

ID
This specifies the type of context.

SAPI predefined context IDs

	Context type
Date	date_mdy date_dmy date_ymd date_ym date_my date_dm date_md date_year
Time	time
Number	number_cardinal number_digit number_fraction number_decimal
Phone_Number	phone_number
Currency	currency
Web	web_url web_email
Postal	postal address_postal

⮝ Back to top

[This is preliminary documentation and subject to change.]

Context tag definition

The CONTEXT tag specifies the normalization of a block of text. This specification defines the SAPI predefined attributes (ID) for the CONTEXT tag. These IDs are strings. SAPI does not perform any parameter validation on the string passed to the engine, hence, the application can specify engine-specific normalization IDs to the engine. Engine-specific strings should begin with the engine vendor's name to avoid confusion between engines.

For example:

<CONTEXT ID = "MS_My_Context"> text </CONTEXT>

The exact implementation of some of these values is dependent on the engine in SAPI 5. In order to force a certain normalization, the application developer may choose to use another SAPI tag, an engine specific ID, or normalize the text themselves. Each context tag may contain more than one string.

For example:

<CONTEXT ID = "date_mdy"> 12/21/99 11/21/99 10/21/99 </CONTEXT>
would be normalized to "December twenty first nineteen ninety nine November twenty first nineteen ninety nine October twenty first nineteen ninety nine."

Note: In SAPI 5.0 the exact implementation of some of these values depends on the engine. In order to force a certain normalization, the application developer may choose to use another SAPI tag or an engine specific ID. The developer may choose to normalize the text.

The following predefined context types are covered in this section:

- Date
- Time
- Number
- Phone_Number
- Currency
- Web
- E-mail
- Address

Date

This context specifies that the number passed to the engine is a date. Dates will generally have the format of number [delimiter] number [delimiter] number or number [delimiter] number where the delimiter may be a '.', '/' or '-', and numbers are typically between 01 and 12 for months, 01 and 31 for days. A year is generally a two or four digit number.
The following are valid string types:

date_mdy
This will normalize the date such that the first group of numbers is the month, the second group is the day, and the third group is the year. In the case where the year is a two digit number, the engine may read it as a two digit number or a four digit number.

For example:

<context ID = "date_mdy">12/21/99</context>
will be normalized to "December twenty first ninety nine"
or "December twenty first nineteen ninety nine"

<context ID = "date_mdy">12/21/1999</context>
will be normalized to "December twenty first nineteen ninety nine"

⩓ Back to top

date_dmy

This will normalize the date such that the first group of numbers is the day, the second group is the month, and the third group is the year. In the case where the year is a two digit number, the engine should read it as a two digit number. If the year is represented as a four digit number, it will be represented as a four digit year.

For example:

<context ID = "date_dmy">21.12.99</context>
will be normalized to "December twenty first ninety nine"
or "December twenty first nineteen ninety nine"

<context ID = "date_ dmy">21-12-1999</context>
will be normalized to "December twenty first nineteen ninety nine"

⩓ Back to top

date_ymd

This will normalize the date such that the first group of numbers is the year, the second group is the month, and the third group is the day. In the case where the year is a two digit number, the engine should read it as a two digit number. If the year is represented as a four digit number, it will be represented as a four digit year.

For example:

<context ID = "date_ymd">99-12-21</context>
will be normalized to "December twenty first ninety nine"
or "December twenty first nineteen ninety nine"

<context ID = "date_ ymd">1999.12.21</context>
will be normalized to "December twenty first nineteen ninety nine"

⩓ Back to top

date_ym

This will normalize the date such that the first group of numbers is the year, and the second group is the month. In the case where the year is a two digit number, the engine should read it as a two digit number. If the year is represented as a four digit number, it will be represented as a four digit year.

For example:

<context ID = "date_ym">99-12</context>
will be normalized to "December ninety nine"
or "December nineteen ninety nine"

<context ID = "date_ ym">1999.12</context>
will be normalized to "December nineteen ninety nine"

⮝ Back to top

date_my
This will normalize the date such that the first group of numbers is the month, and the second group is the year. In the case where the year is a two digit number, the engine should read it as a two digit number. If the year is represented as a four digit number, it will be represented as a four digit year.

For example:

<context ID = "date_my">12/99</context>
will be normalized to "December ninety nine"
or "December nineteen ninety nine"

<context ID = "date_my">12/1999</context>
will be normalized to "December nineteen ninety nine"

⮝ Back to top

date_dm
This will normalize the date such that the first group of numbers is the day and the second group is the month.

For example:

<context ID = "date_dm">21.12</context>
will be normalized to "December twenty first"

⮝ Back to top

date_md
This will normalize the date such that the first group of numbers is the month and the second group is the day.

For example:

<context ID = "date_md">12/21</context>
will be normalized to "December twenty first"

⮝ Back to top

date_year
This will normalize the date such that the number is read as a year.

For example:

<context ID = "date_year">1999</context>
will be normalized to "nineteen ninety nine"

<context ID = "date_year">2001</context>
will be normalized to "Two thousand one"

⩯ Back to top

Time

This context specifies that the number passed to the engine is a time. Times will generally have the format of number [delimiter] number [delimiter] number or number [delimiter] number where the delimiter is ':' or ' ' ' or ' " ' and numbers are typically between 01 and 24 for hours, 01 and 59 for minutes and seconds.

When a zero is present in numbers between 01 and 09, the engine may choose to ignore this, or normalize it as "oh". The engine may also choose to place an "and" in the normalized time. The valid string types are:

For example:

<context ID = "time">12:30</context>
will be normalized to "twelve thirty"

<context ID = "time">01:21</context>
may be normalized as "one twenty one"
or "oh one twenty one"

<context ID = "time">1'21"</context>
may be normalized as "one minute twenty one seconds"
or "one minute and twenty one seconds"

⩯ Back to top

Number

number_cardinal
The text should be normalized as a number using the regular format of ones, tens, etc. The engine may choose to place "and" in the normalized text.

For example:

<context ID = "number_cardinal">3432</context>
will be normalized to "three thousand four hundred thirty two"

<context ID = "number_cardinal">3432</context>
will be normalized to "three thousand four hundred and thirty two"

⩯ Back to top

number_digit
The text should be normalized digit by digit.

For example:

<context ID = "number_digit">3432</context>
will be normalized to "three four three two"

⌅ Back to top

number_fraction
The text should be normalized as a fraction.

For example:

<context ID = "number_fraction">3/15</context>
will be normalized to "three fifteenths" or "three over fifteen"

⌅ Back to top

number_decimal
The text should be normalized as a decimal value.

For example:

<context ID = "number_decimal">423.1243</context>
will be normalized to "four hundred and twenty three point one two four three"

⌅ Back to top

Phone_Number
The text should be normalized as a phone number. The exact implementation of this will be left to the engine and maybe defined in a future release of SAPI.

⌅ Back to top

Currency
The text should be normalized as a currency. The exact implementation of this will be left to the engine and maybe defined in a future release of SAPI.

For example:

<context ID = "currency">$34.90</context>
will be normalized to "thirty four dollars and ninety cents"

⌅ Back to top

Web

The text should be normalized as a url. The exact implementation of this will be left to the engine and maybe defined in a future release of SAPI.

web_url

For example:

<context ID = "web_url">www.Microsoft.com</context>

will be normalized to "may be normalized to "w w w dot Microsoft dot com"

Back to top

E-mail

The text should be normalized as e-mail. The exact implementation of this will be left to the engine and maybe defined in a future release of SAPI.

E-mail_address
The text should be normalized as an e-mail address. The exact implementation of this will be left to the engine and maybe defined in a future release of SAPI.

For example:

<context ID = "E-mail_Address">someone@microsoft.com</context>
may be normalized to "Someone at Microsoft dot com"

Back to top

Address

The text should be normalized as an address. The exact implementation of this will be left to the engine and maybe defined in a future release of SAPI.

For example:

<context ID = "address">One Microsoft Way, Redmond, WA, 98052</context>
will be normalized to "One Microsoft Way Redmond Washington nine eight zero five two"

address_postal
The text should be normalized as a postal address. The exact implementation of this will be left to the engine and maybe defined in a future release of SAPI.

For example:

<context ID = "address_postal">A2C 4X5</context>
will be normalized to "A 2 C 4 X 5"

Back to top

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpVoice

The ISpVoice interface enables an application to perform text synthesis operations.

When to Use

An application uses the ISpVoice interface to communicate with a SAPI-compliant TTS engine. The ISpVoice::Speak method creates a synthesized output using the engine. It is possible for an application to speak text files or mix synthesized text with audio files in addition to text streams. An application can do this by speaking synchronously or asynchronously.

Applications can choose a specific TTS voice using the ISpVoice::SetVoice. In order to change the state of the voice (for example, rate, pitch, and volume), use XML inside the ::speak call. Voices can receive different priorities using the ISpVoice::SetPriority. This allows voices with a higher priority to interrupt a voice with a lower priority.

SAPI returns synthesis events to the application informing the application that the engine has processed a certain event such as bookmarks or phonemes.

ISpVoice inherits from the ISpEventSource interface.

Methods in Vtable Order

ISpVoice Methods	**Description**
SetOutput	Sets the current output destination.
GetOutputObjectToken	Retrieves the current output stream object token.
GetOutputStream	Retrieves a pointer to an output stream.
Pause	Pauses the voice and closes the output device.
Resume	Sets the output device to the RUN state and resumes rendering.
SetVoice	Sets the identity of a voice used in text synthesis.
GetVoice	Retrieves the engine voice token information.
Speak	Enables the engine to speak the contents of a speak a text buffer.
SpeakStream	Enables the engine to speak the contents of a stream.
GetStatus	Retrieves the current rendering and event status associated with this voice.
Skip	Enables the engine to skip ahead the specified number of items within the current speak request.
SetPriority	Sets the queue priority for a voice.
GetPriority	Retrieves the current voice priority level.
SetAlertBoundary	Specifies which event should be used as the insertion point for alerts.
GetAlertBoundary	Retrieves which event should be used as the insertion point for alerts.
SetRate	Sets the engine's rate of spoken text.
GetRate	Retrieves the engine's rate of spoken text.

SetVolume	Sets the output volume level.
GetVolume	Retrieves the current output volume level.
WaitUntilDone	Specifies the time interval to wait for the speech queue to complete processing.
SetSyncSpeakTimeout	Sets the timeout interval for synchronous speech operations.
GetSyncSpeakTimeout	Retrieves the timeout interval for synchronous speech operations.
SpeakCompleteEvent	Returns an event handle used to wait until the voice has completed speaking.
IsUISupported	Determines if the specified type of UI is supported.
DisplayUI	Displays the requested UI.

ISpVoice::SetOutput

ISpVoice::SetOutput sets the current output destination. Output may be in the form of audio or text.

```
SetOutput(
   IUnknown    *pUnkOutput,
   BOOL         fAllowFormatChanges
);
```

Parameters

pUnkOutput
[in] Address of an IUnknown interface containing the output stream destination information.

fAllowFormatChanges
[in] Flag specifying whether the stream is set to allow format changes.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.
E_POINTER	Invalid pointer.
E_OUTOFMEMORY	Exceeded available memory.

ISpVoice::GetOutputObjectToken

ISpVoice::GetOutputObjectToken retrieves the current output stream object token.

```
HRESULT GetOutputObjectToken(
   ISpObjectToken    **ppObjectToken
);
```

Parameters

ppObjectToken
[out] Address of the ISpObjectToken that receives the output stream object token.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpVoice::GetOutputStream

ISpVoice::GetOutputStream retrieves a pointer to an output stream.

```
HRESULT GetOutputStream(
   ISpStreamFormat    **ppStream
);
```

Parameters

ppStream
[out] Address of a pointer to an ISpStreamFormat that receives the output stream.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpVoice::Pause

ISpVoice::Pause pauses the voice and closes the output device.

```
HRESULT  Pause  ( void );
```

Parameters

None.

Return values

Value	Description
S_OK	Function completed successfully.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpVoice::Resume

ISpVoice::Resume sets the output device to the RUN state and resumes rendering.

```
HRESULT  Resume  ( void );
```

Parameters

None.

Return values

Value	Description
S_OK	Function completed successfully.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpVoice::SetVoice

ISpVoice::SetVoice sets the identity of a voice used in text synthesis.

```
HRESULT SetVoice(
   ISpObjectToken    *pToken
);
```

Parameters

pToken
: [in] Address of the ISpObjectToken interface containing the voice implementation to be used in the synthesis operation for this ISpVoice instance. The system default voice is selected if this pointer is NULL.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.
E_POINTER	Invalid pointer.

Remarks

- Changing the voice selection will preserve the same volume and rate levels for a voice.
- If the SetVoice method is not called, the first call into the ISpVoice interface requiring a voice implementation will initialize it. This results in the default voice for the system to be chosen and initialized for this ISpVoice instance.

[This is preliminary documentation and subject to change.]

ISpVoice::GetVoice

ISpVoice::GetVoice retrieves the voice identity used in text synthesis.

```
HRESULT GetVoice(
   ISpObjectToken    **ppToken
);
```

Parameters

ppToken
: [out] Address of a pointer to the ISpObjectToken object representing the synthesized voice implementation used for this ISpVoice instance.

Return values

Value	Description
S_OK	Function completed successfully.

E_INVALIDARG	One or more arguments are invalid.
E_POINTER	Invalid pointer.

Note:

If there is an error in the initialization of GetVoice, the error returned will not occur until Speak or SpeakStream methods are called.

[This is preliminary documentation and subject to change.]

ISpVoice::Speak

ISpVoice::Speak enables the engine to speak the contents of a stream.

This stream may be a text file, text buffer, wav file or other streaming source.

```
HRESULT Speak(
   const WCHAR   *pwcs,
   DWORD          dwFlags,
   ULONG         *pulStreamNumber
);
```

Parameters

pwcs
: [in, string] Address of a buffer null-terminated text string containing the synthesis markup to be synthesized. This value can be NULL when *dwFlags* is set to SPF_PURGEBEFORESPEAK indicating that the audio data currently being sent to the audio destination is to be purged and the synthesis process stopped.

dwFlags
: [in] Value indicating the attributes of the text stream. These values are contained in the SPEAKFLAGS enumeration.

pulStreamNumber
: [out] Address of a value specifying the current input stream number associated with this Speak instance.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.
E_POINTER	Invalid pointer.
E_OUTOFMEMORY	Exceeded available memory.
SPERR_INVALID_FLAGS	Invalid flags specified for this operation.
SPERR_DEVICE_BUSY	Timeout occurred on synchronous call.

Remarks

- The first call into ISpVoice::Speak or ISpVoice::SpeakStream for an ISpVoice instance will be assigned a stream number of zero. Every subsequent call to Speak and SpeakStream is assigned one plus the stream number of the previous call to either Speak or SpeakStream (relative to the ISpVoice instance, not the calling thread).
- If there is an error in the initialization of ISpVoice::GetVoice, the error returned will not occur until ISpVoice::Speak or ISpVoice::SpeakStream methods are called.

[This is preliminary documentation and subject to change.]

ISpVoice::SpeakStream

ISpVoice::SpeakStream enables the engine to speak the contents of a stream.

```
HRESULT SpeakStream(
   IStream     *pStream,
   DWORD        dwFlags,
   ULONG       *pulStreamNumber
);
```

Parameters

pStream
[in] Address of an IStream interface containing the input stream. If the ISpStreamFormat interface is not supported the input stream format type is specified as *SPFID_Text*.

dwFlags
[in] Value indicating the attributes of the text stream. These values are contained in the SPEAKFLAGS enumeration.

pulStreamNumber
[out] Address of a variable that receives the current input stream number associated with this SpeakStream instance.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.
E_POINTER	Invalid pointer.
E_OUTOFMEMORY	Exceeded available memory.
SPERR_INVALID_FLAGS	Invalid flags specified for this operation.
SPERR_DEVICE_BUSY	Timeout on synchronous call.

Remarks

- If the input stream is wav data, it is sent directly to the destination stream.
- If the input stream is text data, it is processed by the text-to-speech (TTS) engine.
- The first call into Speak or SpeakStream for an ISpVoice instance will be assigned a stream number of zero. Every subsequent call to Speak and SpeakStream is assigned one

stream number of zero. Every subsequent call to Speak and SpeakStream is assigned one plus the stream number of the previous call to either Speak or SpeakStream (relative to the ISpVoice instance, not the calling thread).

[This is preliminary documentation and subject to change.]

ISpVoice::GetStatus

ISpVoice::GetStatus retrieves the current rendering and event status associated with this *ISpVoice* instance.

```
HRESULT GetStatus(
   SPVOICESTATUS  *pStatus,
   WCHAR          **ppszLastBookmark
);
```

Parameters

pStatus
: [out] Address of a SPVOICESTATUS structure receiving the status information. Optionally, this can be NULL if the caller does not want this information.

ppszLastBookmark
: [out, string] Address of a pointer to a CoTaskMemAlloc allocated null-terminated string containing the last bookmark reached. If there are no last bookmarks, then a NULL will returned. Applications implementing this method must call CoTaskMemFree() to free memory associated with this string. Optionally, this value can be NULL if this return value is not needed.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.
E_POINTER	Invalid pointer.
E_OUTOFMEMORY	Exceeded available memory.

[This is preliminary documentation and subject to change.]

ISpVoice::Skip

ISpVoice::Skip enables the engine to skip ahead the specified number of items within the current speak request.

```
HRESULT Skip(
   WCHAR   *pItemType,
   long     lNumItems,
   long      lNumItems,
   ULONG     *pulNumSkipped
);
```

Parameters

pItemType
: [in,string] Specifies the skipped speak request item type.

lNumItems
: [in] Specifies the number of items to skip in the current speak request.

pulNumSkipped
: [out] The actual number of items skipped.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*pItemType* is invalid or bad.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpVoice::SetPriority

ISpVoice::SetOutput sets the queue priority for a voice.

```
HRESULT SetPriority(
   SPVPRIORITY   ePriority
);
```

Parameters

ePriority
: [in] Queue priority of type SPVPRIORITY associated with the current voice.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.

Remarks

- The alert priority voice will interrupt a normal priority voice.
- When two alert priority voices are specified, the first voice will finish before the second voice will proceed.
- SPVPRI_OVER is supported only on Windows 2000.

[This is preliminary documentation and subject to change.]

ISpVoice::GetPriority

ISpVoice::GetPriority retrieves the current voice priority level.

```
HRESULT GetPriority(
   SPVPRIORITY   *pePriority
);
```

Parameters

pePriority
[out] Priority information of type SPVPRIORITY.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	Invalid pointer.

[This is preliminary documentation and subject to change.]

ISpVoice::SetAlertBoundary

ISpVoice::SetAlertBoundary specifies which event should be used as the insertion point for alerts.

```
HRESULT SetAlertBoundary(
   SPEVENTENUM   eBoundary
);
```

Parameters

eBoundary
[in] Address of a SPEVENTENUM enumeration that specifies which event to use for the alert insertion point information.

Return values

Value	Description

S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpVoice::GetAlertBoundary

ISpVoice::GetAlertBoundary retrieves which event to be used as the insertion point for alerts.

```
HRESULT GetAlertBoundary(
   SPEVENTENUM   *peBoundary
);
```

Parameters

peBoundary
[out] Address of a SPEVENTENUM enumeration that receives the event information specifying the alert insertion point information.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	Invalid pointer.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpVoice::SetRate

ISpVoice::SetRate sets the engine's rate of spoken text relative to the normal rate.

See Engine Characteristics for a detailed explaination of rate adjustment.

```
HRESULT SetRate(
   long   RateAdjust
);
```

Parameters

RateAdjust

[in] Value specifying the spoken text units per minute rate.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.
E_NOTIMPL	This functionality is not implemented.

Remarks

- Voices do not have the same default rate.
- The granularity of the rate is engine dependent.

[This is preliminary documentation and subject to change.]

ISpVoice::GetRate

ISpVoice::GetRate retrieves the engine's rate of spoken text relative to the normal rate.

See Engine Characteristics for a detailed explanation of rate adjustment.

```
HRESULT GetRate(
   long   *pRateAdjust
);
```

Parameters

pRateAdjust
[out] Address of the value that receives the relative spoken text rate information. Range must be between -10 and 10, inclusive.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.
E_NOTIMPL	This functionality is not implemented.

[This is preliminary documentation and subject to change.]

ISpVoice::SetVolume

ISpVoice::SetVolume sets the output volume level of speech synthesized by an engine.

See Engine Characteristics for a detailed explanation of volume adjustment.

```
HRESULT SetVolume(
   USHORT   usVolume
);
```

Parameters

usVolume
: [in] Value containing the volume level information. Volume levels are specified in percentage values ranging from 0 to 100 percent.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.

Remarks

- Volume is specified as a percentage of the maximum volume of the current voice. Each voice implementation has its own maximum volume.
- The *usVolume* parameter must between 0 (SPMIN_VOLUME) and 100 (SPMAX_VOLUME) inclusive. These values are contained in the SPVLIMITS enumeration sequence.

ISpVoice::GetVolume

ISpVoice::GetVolume retrieves the current output volume level of speech synthesized by an engine.

See Engine Characteristics for a detailed explanation of volume adjustment.

```
HRESULT GetVolume(
   USHORT   *pusVolume
);
```

Parameters

pusVolume
: [out] Address of the value that receives the volume level information. Volume levels are specified in percentage values ranging from 0 to 100 percent.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	Invalid pointer.

Notes:

- When an ISpVoice object is first instantiated, it will have a volume of SPMAX_VOLUME.
- Volume is specified as a percent of the maximum volume of the current voice. Each voice implementation has its own maximum volume.
- The *pusVolume* parameter must between 0 (SPMIN_VOLUME) and 100 (SPMAX_VOLUME) inclusive. These values are contained in the SPVLIMITS enumeration sequence.

[This is preliminary documentation and subject to change.]

ISpVoice::WaitUntilDone

ISpVoice::WaitUntilDone specifies the time interval in milliseconds that the engine should wait for all queued Speak and SpeakStream actions associated with this ISpVoice instance to have completed. Completion of a queued Speak or SpeakStream action is based on when an audio object has committedd its audio playing.

```
HRESULT WaitUntilDone(
   ULONG   msTimeout
);
```

Parameters

msTimeout
: [in] Value specifying the time interval in milliseconds to wait before the WaitUntilDone method times out with an error. The WaitUntilDone method will not time out by specifying INFINITE for this value.

Return values

Value	Description
S_OK	Function completed successfully.
S_FALSE	Wait time interval was exceeded.

[This is preliminary documentation and subject to change.]

ISpVoice::SetSyncSpeakTimeout

ISpVoice::SetSyncSpeakTimeout sets the timeout interval in milliseconds after which, synchronous Speak and SpeakStream calls to this instance of ISpVoice will timeout.

```
HRESULT SetSyncSpeakTimeout(
   ULONG   msTimeout
);
```

Parameters

msTimeout
[in] Value specifying the timeout interval in milliseconds for synchronous speech operations. The SetSyncSpeakTimeout method will not time out by specifying INFINITE for this value.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.

Remarks

- The timeout interval is set for each ISpVoice instance and by default it is set to 10 seconds when the timeout interval is not specified in SetSyncSpeakTimeout.

[This is preliminary documentation and subject to change.]

ISpVoice::GetSyncSpeakTimeout

ISpVoice::GetSyncSpeakTimeout retrieves the timeout interval for synchronous speech operations for this ISpVoice instance.

```
HRESULT GetSyncSpeakTimeout(
   ULONG   *pmsTimeout
);
```

Parameters

pmsTimeout
[out] Address of the timeout interval in milliseconds for synchronous speech operations.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	Invalid pointer.

[This is preliminary documentation and subject to change.]

ISpVoice::SpeakCompleteEvent

ISpVoice::SpeakCompleteEvent returns an event handle used to wait until the voice has completed speaking.

This is similar to the functionality provided by ISpVoice::WaitUntilDone, but allows the caller to wait on the event handle. The event handle is owned by this object and is not duplicated.

The caller must neither call CloseHandle(), nor should the caller ever use the handle after releasing the COM reference to this object.

```
[local] HANDLE  SpeakCompleteEvent  ( void );
```

Parameters

None.

Return values

Value	Description
Event Handle	For WAIT operation.

[This is preliminary documentation and subject to change.]

ISpVoice::IsUISupported

ISpVoice::IsUISupported determines if the specified type of UI is supported.

```
[local] HRESULT IsUISupported(
    const WCHAR   *pszTypeOfUI,
    void          *pvExtraData,
    ULONG          cbExtraData,
    BOOL          *pfSupported
);
```

Parameters

Parameters

pszTypeOfUI
[in] Address of the null-terminated string containing the UI type that is being queried.
pvExtraData
[in] Pointer to additional information needed for the object.
cbExtraData
[in] Size, in bytes, of the ExtraData.
pfSupported
[out] Flag specifying whether the specified UI is supported. TRUE indicates the UI is supported, and FALSE indicates the UI is not supported.

Return values

Value	**Description**
S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpVoice::DisplayUI

ISpVoice::DisplayUI displays the requested UI.

```
[local] HRESULT DisplayUI(
   HWND          hwndParent,
   const WCHAR   *pszTitle,
   const WCHAR   *pszTypeOfUI,
   void          *pvExtraData,
   ULONG          cbExtraData
);
```

Parameters

hwndParent
[in] Specifies the parent window handle information.
pszTitle
[in] Address of a null-terminated string containing the window title information.
pszTypeOfUI
[in] Address of the null-terminated string containing the requested UI type to display.
pvExtraData
[in] Pointer to additional information needed for the object.
cbExtraData
[in] Size, in bytes, of the ExtraData.

Return values

Value	**Description**

S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.
FAILED(hr)	Appropriate error message.

Appendix B

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

Engine-Level Interfaces

This section describes the interfaces and methods for incorporating speech engines into applications. They are intended for use at the DDI or device driver interface level. Some managers or interfaces may have entries also in the Application-Level Interfaces section. However, entries listed here apply only to the device driver or engine level.

- Grammar Compiler Manager
- Resource Manager
- Speech Recognition Manager
- Speech Recognition Engine Manager
- Text-to-Speech Engine Manager

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

Grammar Compiler Manager (DDI-level)

The following section covers:

- ISpErrorLog
- ISpGramCompBackend
- ISpGrammarCompiler
- ISpITNProcessor
- ISpCFGEngineClient
- ISpCFGInterpreter
- ISpCFGInterpreterSite

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpErrorLog

Methods in Vtable Order

ISpErrorLog Methods	Description
AddError	Writes an error to the log file.

[This is preliminary documentation and subject to change.]

ISpErrorLog::AddError

ISpErrorLog::AddError writes an error to the log file.

This function is application-defined and may be customized for the application's needs. By default, no action is performed.

```
HRESULT AddError(
   const long     lLineNumber,
   HRESULT        hr,
   const WCHAR   *pszDescription,
   const WCHAR   *pszHelpFile,
   DWORD          dwHelpContext
);
```

Parameters

lLineNumber
    The line number of the error.
hr
    The error code being logged.
pszDescription
    A textual description of the error.
pszHelpFile
    The file being written to.
dwHelpContext
    Flags providing additional information for the log.

Return values

Value	Description
S_OK	Function completed successfully.
FAILED (hr)	Appropriate error message.

Because this method is application defined, the return value may change. See specific vendor documentation for details.

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpGramCompBackend

ISpGramCompBackend inherits from the ISpGrammarBuilder interface.

Methods in Vtable Order

ISpGramCompBackend Methods	**Description**
SetSaveObjects	Sets the storage location of the binary grammar.
InitFromBinaryGrammar	Initializes a grammar from binary data.

[This is preliminary documentation and subject to change.]

ISpGramCompBackend::SetSaveObjects

ISpGramCompBackend::SetSaveObjects sets the storage location of the binary grammar.

When the ISpGrammarBuilder::Commit method is called, the grammar compiler back end writes the binary grammar to the location of *pStream*. When calling the SetSaveObjects method multiple times, the last call made before calling the Commit method, receives the binary grammar.

```
HRESULT SetSaveObjects(
   IStream      *pStream,
   ISpErrorLog  *pErrorLog
);
```

Parameters

pStream
    Address of the IStream that receives the binary grammar.
pErrorLog
    Address of the ISpErrorLog interface that receives the error information.

Return values

Value	**Description**
S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpGramCompBackend::InitFromBinaryGram

ISpGramCompBackend::InitFromBinaryGrammar initializes a grammar from binary data.

```
HRESULT InitFromBinaryGrammar(
   const   SPBINARYGRAMMAR  *pBinaryData
);
```

Parameters

pBinaryData
Pointer to the grammar list.

Return values

Value	Description
S_OK	Function completed successfully.
E_OUTOFMEMORY	Exceeded available memory.
FAILED (hr)	Appropriate error message.

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpGrammarCompiler

Methods in Vtable Order

ISpGrammarCompiler Methods	Description
CompileStream	Loads the XML file into the DOM.

[This is preliminary documentation and subject to change.]

ISpGrammarCompiler::CompileStream

ISpGrammarCompiler::CompileStream loads the XML file into the DOM.

Also loads the XML that contains the <DEFINE> in case it is different from the main file specified by -d flag.

```
HRESULT CompileStream(
   IStream        *pSource,
   IStream        *pDest,
   IStream        *pHeader,
   IStream        *pDefine,
   ISpErrorLog    *pErrorLog,
   DWORD           dwFlags
);
```

Parameters

pSource
    Pointer to the source.
pDest
    Pointer to the destination.
pHeader
    Pointer to the stream header.
pDefine
    Pointer to the definition.
pErrorLog
    Pointer to the error log receiving the messages.
dwFlags
    [in] Not currently used. May be NULL.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	One of the parameters is bad or invalid.
FAILED (hr)	Appropriate error message.

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpITNProcessor

ISpITNProcessor interface is implemented by SAPI to do the Inverse Text Normalization (ITN).

Methods in Vtable Order

ISpITNProcessor Methods	Description
LoadITNGrammar	Loads an inverse text normalization grammar.
ITNPhrase	Parses an inverse text normalization phrase.

[This is preliminary documentation and subject to change.]

ISpITNProcessor::LoadITNGrammar

ISpITNProcessor::LoadITNGrammar loads an inverse text normalization (ITN) grammar. The loaded grammar can be used by either SAPI or the speech recognition (SR) engine.

```
HRESULT LoadITNGrammar(
   WCHAR    *pszCLSID
);
```

Parameters

pszCLSID
Address of the null-terminated string containing the CLSID of the ITN grammar object implementing ISpCFGInterpreter.

Return values

Value	**Description**
S_OK	Function completed successfully.
E_POINTER	*pszCLSID* is invalid or bad.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpITNProcessor::ITNPhrase

ISpITNProcessor::ITNPhrase parses an inverse text normalization (ITN) phrase.

The ITNPhrase will attempt to parse the *pPhrase* passed in using the ITN grammar loaded by ISpITNProcessor::LoadITNGrammar. If a parse is found, the ITN grammar will add the display text replacement. For example, AddReplacement "$100" for "one hundred dollars".

```
HRESULT ITNPhrase(
   ISpPhraseBuilder    *pPhrase
);
```

Parameters

pPhrase
Address of the phrase to parse.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	No words are available.
SP_NO_RULE_ACTIVE	No rules are available.
E_OUTOFMEMORY	Not enough memory to complete operation.
FAILED(hr)	Appropriate error message.

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpCFGEngineClient

The ISpCFGEngineClient interface allows the CFG engine to notify the SR engine of changes in the status of loaded grammars.

When to Implement

Implemented by an SR engine.

Methods in Vtable Order

ISpCFGEngineClient Methods	Description
WordNotify	Notifies the SR engine of events related to the addition or deletion of words in the loaded grammars.
RuleNotify	Notifies the SR engine of events related to the addition, deletion, activation, or deactivation of rules in the loaded grammars.

[This is preliminary documentation and subject to change.]

ISpCFGEngineClient::WordNotify

ISpCFGEngineClient::WordNotify notifies SR engine of events related to the addition or deletion of words in the loaded grammars.

Duplication words (from multiple grammars) are added only once.

```
HRESULT WordNotify(
    SPCFGNOTIFY          Action,
    ULONG                cWords,
   const   SPWORDENTRY   *pWords
);
```

Parameters

Action
: The action being taken of type SPCFGNOTIFY. Must be either SPCFGN_ADD or SPCFGN_REMOVE.

cWords
: The number of words in *pWords*.

pWords
: An array of words for which *Action* specifies.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	One or more of the parameters are invalid.
E_OUTOFMEMORY	Exceeded available memory.
E_FAIL	Operation failed for unspecified reason.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpCFGEngineClient::RuleNotify

ISpCFGEngineClient::RuleNotify notifies SR engine of events related to the addition, deletion, activation, or deactivation of rules in the loaded grammars.

```
HRESULT RuleNotify(
   SPCFGNOTIFY            Action,
   ULONG                  cRules,
   const   SPRULEENTRY    *pRules
);
```

Parameters

Action
: The action being taken of type SPCFGNOTIFY. Must be either SPCFGN_ADD, SPCFGN_REMOVE, SPCFGN_ACTIVATE, SPCFGN_DEACTIVATE, or SPCFGN_INVALIDATE.

cRules
: The number of rules in *pRules*.

pRules
: An array of rules for which *Action* specifies.

Return values

Value	**Description**
S_OK	Function completed successfully.
FAILED (hr)	Appropriate error message.

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpCFGInterpreter

Methods in Vtable Order

ISpCFGInterpreter Methods	**Description**
InitGrammar	
Interpret	

[This is preliminary documentation and subject to change.]

ISpCFGInterpreter::InitGrammar

ISpCFGInterpreter::InitGrammar

```
HRESULT InitGrammar(
   const WCHAR   *pszGrammarName,
   const void   **pvGrammarData
);
```

Parameters

pszGrammarName
[in]
pvGrammarData
[in]

Return values

Value	**Description**
S_OK	Function completed successfully.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpCFGInterpreter::Interpret

ISpCFGInterpreter::Interpret

```
HRESULT Interpret(
   ISpPhraseBuilder          *pPhrase,
   const ULONG                ulFirstElement,
   const ULONG                ulCountOfElements,
   ISpCFGInterpreterSite     *pSite
);
```

Parameters

pPhrase
  [in]
ulFirstElement
  [in]
ulCountOfElements
  [in]
pSite
  [in]

Return values

Value	Description
S_OK	Function completed successfully.
FAILED(hr)	Appropriate error message.

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpCFGInterpreterSite

Methods in Vtable Order

ISpCFGInterpreterSite Methods	Description
AddTextReplacement	Adds one text replacement to the phrase.
AddProperty	Adds a property entry to the phrase object.
GetResourceValue	Retrieves the resource information for a grammar.

[This is preliminary documentation and subject to change.]

ISpCFGInterpreterSite::AddTextReplacement

ISpCFGInterpreterSite::AddTextReplacement adds one text replacement to the phrase. The object must have been initialized by calling SetPhrase prior to calling this method.

```
HRESULT AddTextReplacement(
   SPPHRASEREPLACEMENT   *pReplace
);
```

Parameters

pReplace
[in] Address of the SPPHRASEREPLACEMENT that contains the replacement text.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*cReplacements* is zero or *pReplace* is invalid.
SPERR_UNINITIALIZED	The object is uninitialized.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpCFGInterpreterSite::AddProperty

ISpCFGInterpreterSite::AddProperty adds a property entry to the phrase object.

```
HRESULT AddProperty(
   SPPHRASEPROPERTY   *pProperty
);
```

Parameters

pProperty
[in] Address of the SPPHRASEPROPERTY structure that contains the property information.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*pProperty* is bad or invalid.
SPERR_UNINITIALIZED	The object is uninitialized.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpCFGInterpreterSite::GetResourceValue

ISpCFGInterpreterSite::GetResourceValue retrieves the resource information for a grammar.

```
HRESULT GetResourceValue(
   const SPRULEHANDLE   hRule,
   const WCHAR         *pszResourceName,
   WCHAR              **ppCoMemResource
);
```

Parameters

hRule
: [in] The rule handle containing the valid rule ID and index.

pszResourceName
: [in] The name of the resource from which to retrieve the grammar information.

ppCoMemResource
: [out] Pointer containing the passed back resource value.
Applications implementing this method must call CoTaskMemFree() to free memory associated with this resource.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	One of the parameters is bad or invalid.
E_OUTOFMEMORY	Exceeded available memory.
FAILED(hr)	Appropriate error message.

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

Resource Manager (DDI-level)

The following section covers:

- ISpObjectTokenEnumBuilder
- ISpTokenUI
- ISpTaskManager
- ISpThreadControl
- ISpThreadTask

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpObjectTokenEnumBuilder

This interface inherits from IEnumSpObjectTokens.

Methods in Vtable Order

ISpObjectTokenEnumBuilder Methods	**Description**
SetAttribs	Sets the required and optional token enumerator attribute information.
AddTokens	Adds tokens to the object token enumerator.
AddTokensFromDataKey	Adds a new token using specified subkey and CategoryId information.
AddTokensFromTokenEnum	Adds a new token from an enumerated list of object tokens.
Sort	Sorts the list of enumerated object tokens.

[This is preliminary documentation and subject to change.]

ISpObjectTokenEnumBuilder::SetAttribs

ISpObjectTokenEnumBuilder::SetAttribs sets the required and optional token enumerator attribute information.

```
HRESULT SetAttribs(
   const WCHAR   *pszReqAttribs,
   const WCHAR   *pszOptAttribs
);
```

Parameters

pszReqAttribs
Address of a null-terminated string containing the required attribute information.
pszOptAttribs
Address of a null-terminated string containing the optional attribute information.

Return values

Value	**Description**
S_OK	Function completed successfully.
SPERR_ALREADY_INITIALIZED	The object has already been initialized.
E_OUTOFMEMORY	Exceeded available memory.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpObjectTokenEnumBuilder::AddTokens

ISpObjectTokenEnumBuilder::AddTokens adds tokens to the object token enumerator.

```
HRESULT AddTokens(
   ULONG              cTokens,
   ISpObjectToken    **pToken
);
```

Parameters

cTokens
The number of object tokens being added to the sequence.
pToken
Address of a pointer to an *ISpObjectToken* object containing the information associated with the tokens being added.

Return values

Value	**Description**
S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.
E_POINTER	Invalid pointer.
E_OUTOFMEMORY	Exceeded available memory.
SPERR_UNINITIALIZED	The object has not been properly initialized.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpObjectTokenEnumBuilder::AddTokensFro

ISpObjectTokenEnumBuilder::AddTokensFromDataKey adds a new token using specified subkey and CategoryId information.

```
HRESULT AddTokensFromDataKey(
   ISpDataKey     *pDataKey,
   const WCHAR    *pszSubKey,
   const WCHAR    *pszCategoryId
);
```

Parameters

pDataKey
Address of an ISpDataKey interface that specifies the system registry key to create the token from.

pszSubKey
Address of a null-terminated string containing the system registry subkey information.

pszCategoryId
Address of a null-terminated string containing the category identifier information for the system registry subkey.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.
SPERR_UNINITIALIZED	The object has not been properly initialized.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpObjectTokenEnumBuilder::AddTokensFro

ISpObjectTokenEnumBuilder::AddTokensFromTokenEnum adds a new token from an enumerated list of object tokens.

```
HRESULT AddTokensFromTokenEnum(
   IEnumSpObjectTokens    *pTokenEnum
);
```

Parameters

pTokenEnum
Address of an IEnumSpObjectTokens interface containing the list of enumerated object tokens

to add.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.
SPERR_UNINITIALIZED	The object has not been properly initialized.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpObjectTokenEnumBuilder::Sort

ISpObjectTokenEnumBuilder::Sort sorts the list of enumerated object tokens.

```
HRESULT Sort(
   const WCHAR   *pszTokenIdToListFirst
);
```

Parameters

pszTokenIdToListFirst
Address of a null-terminated string specifying the identifier of the first token in the sorted list.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	Invalid pointer.
SPERR_UNINITIALIZED	The object has not been properly initialized.
FAILED(hr)	Appropriate error message.

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpTokenUI

Methods in Vtable Order

ISpTokenUI Methods	Description
IsUISupported	Determines if the specified UI type is supported by the token.
DisplayUI	Displays the UI associated with the object token.

[This is preliminary documentation and subject to change.]

ISpTokenUI::IsUISupported

ISpTokenUI::IsUISupported determines if the specified UI type is supported by the token.

```
[local] HRESULT IsUISupported(
   const WCHAR     *pszTypeOfUI,
   void            *pvExtraData,
   ULONG            cbExtraData,
   IUnknown        *punkObject,
   BOOL            *pfSupported
);
```

Parameters

pszTypeOfUI
[in] Address of a null-terminated string containing the object's UI type.
pvExtraData
[in] Pointer to additional information needed for the object.
cbExtraData
[in] Size, in bytes, of the ExtraData.
punkObject
[in] Address of the object's IUnknown interface.
pfSupported
[out] Address of a variable that receives the value indicating support for the interface. This value is set to TRUE when this interface is supported and FALSE otherwise.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.
E_POINTER	Invalid pointer.

[This is preliminary documentation and subject to change.]

ISpTokenUI::DisplayUI

ISpTokenUI::DisplayUI displays the UI associated with the object token.

```
[local] HRESULT DisplayUI(
    HWND               hwndParent,
    const WCHAR       *pszTitle,
    const WCHAR       *pszTypeOfUI,
    void              *pvExtraData,
    ULONG              cbExtraData,
    ISpObjectToken    *pToken,
    IUnknown          *punkObject
);
```

Parameters

hwndParent
[in] Specifies the handle of the parent window.
pszTitle
[in] Address of a null-terminated string containing the window title.
pszTypeOfUI
[in] Address of a null-terminated string containing the UI type to display.
pvExtraData
[in] Pointer to additional information needed for the object.
cbExtraData
[in] Size, in bytes, of the ExtraData.
pToken
[in] Address of the ISpObjectToken containing the object token identifier.
punkObject
[in] Address of the IUnknown interface pointer.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.
E_POINTER	Invalid pointer.

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpTaskManager

When to Implement

This interface is used to implement a task management service provider to optimize thread usage.

Methods in Vtable Order

ISpTaskManager Methods	Description
SetThreadPoolInfo	Sets the attributes for thread pool management.
GetThreadPoolInfo	Retrieves the current thread pool management attributes.
QueueTask	Adds a task to the queue for asynchronous task processing.
CreateReoccurringTask	Creates a task entry that will be processed on a high priority thread.
CreateThreadControl	Creates a thread control object.
TerminateTask	Interrupts a specified task.
TerminateTaskGroup	Terminates a group of tasks that match a specific group identifier.

[This is preliminary documentation and subject to change.]

ISpTaskManager::SetThreadPoolInfo

ISpTaskManager::SetThreadPoolInfo defines the thread pool attributes.

```
HRESULT SetThreadPoolInfo(
   const   SPTMTHREADINFO   *pPoolInfo
);
```

Parameters

pPoolInfo
[in] Address of an SPTMTHREADINFO structure that receives the thread management information.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*pPoolInfo* is invalid or *pPoolInfo->lPoolSize* size is less than -1.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpTaskManager::GetThreadPoolInfo

ISpTaskManager::GetThreadPoolInfo retrieves the current thread pool management attributes.

```
HRESULT GetThreadPoolInfo(
   SPTMTHREADINFO   *pPoolInfo
);
```

Parameters

pPoolInfo
[out] Address of an SPTMTHREADINFO structure that contains the current thread management information.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	*pPoolInfo* is invalid or bad.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpTaskManager::QueueTask

ISpTaskManager::QueueTask adds a task to the queue for asynchronous task processing.

```
HRESULT QueueTask(
   ISpTask    pTask,
   void      *pvTaskData,
   HANDLE     hCompEvent,
   DWORD*    *pdwGroupId,
   DWORD*    *pTaskID
);
```

Parameters

pTask
[in] Address of an ISpTask interface containing the task.
pvTaskData
[in] Address of the task data.
hCompEvent
[in] Handle of the task completion event.
pdwGroupId
[in, out] Value specifying the identifier for the task group. This value may be NULL.
pTaskID
[out] Value specifying the task identifier.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*pTask* is invalid or bad.
E_POINTER	*pTaskId* or *pdwGroupId* is invalid or bad.
FAILED (hr)	Appropriate error message.

ISpTaskManager::CreateReoccurringTask

ISpTaskManager::CreateReoccurringTask creates a task entry that will be processed on a high priority thread when the ISpTask::Execute method is called.

These reoccurring tasks are designed to supply data to hardware devices.

```
HRESULT CreateReoccurringTask(
   ISpTask          *pTask,
   void             *pvTaskData,
   HANDLE            hCompEvent,
   ISpNotifySink   **ppTaskCtrl
);
```

Parameters

pTask
   [in] Address of an ISpTask interface containing the task.
pvTaskData
   [in] Address of the task data.
hCompEvent
   [in] Handle of the task completion event.
ppTaskCtrl
   [out] Address of a pointer to an ISpNotifySink interface that receives the task notifications.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*pTask* is invalid or bad.
E_POINTER	*ppTaskCtrl* is invalid or bad.
FAILED (hr)	Appropriate error message.

ISpTaskManager::CreateThreadControl

ISpTaskManager::CreateThreadControl allocates a thread control object. It does not allocate a thread. If the task manager's controlling IUnknown has been allocated by ADDREF since the thread's creation, the allocated thread control object uses the thread pool in the task manager.

```
HRESULT CreateThreadControl(
   ISpThreadTask        *pTask,
   void                 *pvTaskData,
   long                  nPriority,
   ISpThreadControl    **ppTaskCtrl
);
```

Parameters

pTask
[in] Address of the ISpThreadTask interface that is used to initialize and execute the task thread.

pvTaskData
[in] Data passed to all ISpThreadTask member functions. This value can be NULL.

nPriority
[in] The Win32 priority for the allocated thread.

ppTaskCtrl
[out] Address of a pointer to an ISpThreadControl interface that receives the thread control.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*pTask* is invalid or bad.
E_POINTER	*ppThreadCtrl* is invalid or bad.
E_OUTOFMEMORY	Exceeded available memory.
FAILED (hr)	Appropriate error message.

ISpTaskManager::TerminateTask

ISpTaskManager::TerminateTask interrupts the specified task.

```
HRESULT TerminateTask(
   DWORD   dwTaskId,
   ULONG   ulWaitPeriod
);
```

Parameters

dwTaskId
    [in] Value specifying the identifier of the task to interrupt.
ulWaitPeriod
    [in] Number of milliseconds to wait before interrupting the task.

Return values

Value	Description
S_OK	Function completed successfully.
S_FALSE	Method timed out.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpTaskManager::TerminateTaskGroup

ISpTaskManager::TerminateTaskGroup terminates a group of tasks matching the specified group identifier.

```
HRESULT TerminateTaskGroup(
   DWORD    dwGroupId,
   ULONG    ulWaitPeriod
);
```

Parameters

dwGroupId
    [in] Value specifying the identifier for the task group to interrupt.
ulWaitPeriod
    [in] Number of milliseconds to wait before interrupting the task group.

Return values

Value	Description
S_OK	Function completed successfully.
FAILED (hr)	Appropriate error message.

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpThreadControl

The ISpThreadControl interface inherits from the ISpNotifySink interface.

Methods in Vtable Order

ISpThreadControl Methods	Description
StartThread	Initializes a thread and returns a window handle.
WaitForThreadDone	Specifies the time interval to wait before ending thread processing.
TerminateThread	
ThreadHandle	
ThreadId	
NotifyEvent	
WindowHandle	
ThreadCompleteEvent	
ExitThreadEvent	

[This is preliminary documentation and subject to change.]

ISpThreadControl::StartThread

ISpThreadControl::StartThread initializes a thread and returns a window handle.

```
HRESULT StartThread(
   DWORD   dwFlags,
   HWND    *phwnd
);
```

Parameters

dwFlags
Currently not implemented.

phwnd
Optional address of an handle to a window. The handle of the new window will be returned to *phwnd* if this parameter is non-NULL. A window will not be created if this parameter is NULL.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.
E_POINTER	Invalid pointer.
E_OUTOFMEMORY	Exceeded available memory.

[This is preliminary documentation and subject to change.]

ISpThreadControl::WaitForThreadDone

ISpThreadControl::WaitForThreadDone specifies the time interval to wait before ending thread processing.

```
HRESULT WaitForThreadDone(
   BOOL        fForceStop,
   HRESULT    *phrThreadResult,
   ULONG       msTimeOut
);
```

Parameters

fForceStop
  Flag specifies to stop thread processing. Thread processing will stop if the value is TRUE and continue if FALSE.
phrThreadResult
  Address of a handle to a COM return value.
msTimeOut
  Time-out interval in milliseconds to wait before interrupting the task.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.

[This is preliminary documentation and subject to change.]

ISpThreadControl::TerminateThread

ISpThreadControl::TerminateThread

```
HRESULT TerminateThread ( void );
```

Parameters

None.

Return values

Value	**Description**
S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.

[This is preliminary documentation and subject to change.]

ISpThreadControl::ThreadHandle

ISpThreadControl::ThreadHandle retrieves a thread handle.

```
HANDLE  ThreadHandle  ( void );
```

Parameters

None.

Return values

Value	**Description**
S_OK	Method completed successfully.

[This is preliminary documentation and subject to change.]

ISpThreadControl::ThreadId

ISpThreadControl::ThreadId

```
DWORD  ThreadId  ( void );
```

Parameters

None.

Return values

Value	**Description**

[This is preliminary documentation and subject to change.]

ISpThreadControl::NotifyEvent

```
HANDLE  NotifyEvent ( void );
```

Parameters

None.

Return values

Value	Description

[This is preliminary documentation and subject to change.]

ISpThreadControl::WindowHandle

ISpThreadControl::WindowHandle

```
HWND  WindowHandle  ( void );
```

Parameters

None.

Return values

Value	Description
S_OK	Method completed successfully.

[This is preliminary documentation and subject to change.]

ISpThreadControl::ThreadCompleteEvent

ISpThreadControl::ThreadCompleteEvent

```
HANDLE  ThreadCompleteEvent  ( void );
```

Parameters

None.

Return values

Value	Description
S_OK	Method completed successfully.

[This is preliminary documentation and subject to change.]

ISpThreadControl::ExitThreadEvent

ISpThreadControl::ExitThreadEvent

```
HANDLE   ExitThreadEvent(void);
```

Parameters

none.

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpThreadTask

The ISpThreadTask interface simplifies thread-based operations. It allows SAPI to handle specific aspects of threads and thereby avoiding more complex Win32 operations.

When to Implement

If applications need this interface, there are three methods that need to be implemented and they are application specific. These methods may also be defined in more than once instance.

Note:

This is not a COM interface.

Methods in Vtable Order

ISpThreadTask Methods	Description
InitThread	Attempts to create a thread.
ThreadProc	Implements the processing of the thread.
WindowMessage	Implements the processing of window messages.

[This is preliminary documentation and subject to change.]

ISpThreadTask::InitThread

ISpThreadTask::InitThread attempts to create a thread. The thread is created only if it has successfully met the application's criteria. This method is an alternative to creating a thread from Win32 functions.

```
virtual HRESULT STDMETHODCALLTYPE InitThread(
   void   *pvTaskData,
   HWND    hwnd
) = 0;
```

Parameters

pvTaskData
    [in] The specific information for the application.
hwnd
    [in] A window handle.

Return values

S_OK	Function completed successfully.
S_FAILED	Function failed and should not create a new thread.

[This is preliminary documentation and subject to change.]

ISpThreadTask::ThreadProc

ISpThreadTask::ThreadProc implements the processing of the thread. This method will be application specific.

```
virtual HRESULT STDMETHODCALLTYPE ThreadProc(
   void                  *pvTaskData,
   HANDLE                 hExitThreadEvent,
   HANDLE                 hNotifyEvent,
   HWND                   hwndWorker,
   volatile const BOOL   *pfContinueProcessing
) = 0;
```

Parameters

**pvTaskData*
    [in] The specific information for the application.
hExitThreadEvent

[in, out] A handle to a thread object or an array of thread objects.

hNotifyEvent
: [in] A handle to the notification event.

hwndWorker
: [in] A window handle.

pfContinueProcessing
: [in] Boolean flag indicating whether to continue processing. TRUE indicates the process should continue; FALSE otherwise.

Return values

S_OK	Function completed successfully.
S_FAILED	Function failed.

[This is preliminary documentation and subject to change.]

ISpThreadTask::WindowMessage

ISpThreadTask::WindowMessage implements the processing of window messages. Not all applications will need a window and this method may be left unimplemented. However, SAPI maintains a hidden window and messages posted will require this method.

```
virtual LRESULT STDMETHODCALLTYPE WindowMessage(
   void     *pvTaskData,
   HWND      hWnd,
   UINT      Msg,
   WPARAM    wParam,
   LPARAM    lParam
) = 0;
```

Parameters

pvTaskData
: [in] The specific information for the application.

hWnd
: [in] A window handle.

Msg
: [in] The type of window message.

wParam
: Application-specific information. This will change based on the *Msg* value.

lParam
: Application-specific information. This will change based on the *Msg* value.

Return values

The return value is application specific.

with SAPI 5.0

[This is preliminary documentation and subject to change.]

Speech Recognition Manager (DDI-level)

The following section covers:

- ISpPhraseBuilder

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpPhraseBuilder

Note: The ISpPhraseBuilder interface inherits from ISpPhrase.

Methods in Vtable Order

ISpPhraseBuilder Methods	Description
InitFromPhrase	Initializes from a phrase.
InitFromSerializedPhrase	Initializes a phrase from a serialized phrase.
AddElements	Adds a copy of the given element to the end of this object's element list.
AddRules	Adds phrase rules to the phrase object.
AddProperties	Adds property entries to the phrase object.
AddReplacements	Adds one or more text replacements to the phrase.

[This is preliminary documentation and subject to change.]

ISpPhraseBuilder::InitFromPhrase

ISpPhraseBuilder::InitFromPhrase initializes from a phrase.

```
HRESULT InitFromPhrase(
   const   SPPHRASE   *pSrcPhrase
);
```

Parameters

pSrcPhrase

Address of a SPPHRASE data structure containing the phrase information. If *pSrcPhrase* is NULL, then the object is reset to its initial state.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*pSrcPhrase* or *pSrcPhrase->Rule.pNextSibling* is invalid or bad. Alternatively, *pSrcPhrase->LangID* may be zero or *pSrcPhrase->cbSize* does not indicate the same size as *pSrcPhrase*.
FAILED(hr)	Appropriate error message.

Example

The following code snippet demonstrates creating and initializing from a phrase.

```
HRESULT hr;

CComPtr<ISpPhraseBuilder> cpPhraseBuilder;
CComPtr<ISpPhrase>        cpPhrase;
CSpPhrasePtr              pPhrase;

hr = cpPhraseBuilder.CoCreateInstance( CLSID_SpPhraseBuilder );
//Check return value

hr = GetStdRecognition_Phrase( &cpPhrase, CLSID_SpSharedRecogognizer );

hr = cpPhrase->GetPhrase(&pPhrase );
//Check return value

hr = cpPhraseBuilder->InitFromPhrase( pPhrase );
//Check return value
```

[This is preliminary documentation and subject to change.]

ISpPhraseBuilder::InitFromSerializedPhrase

ISpPhraseBuilder::InitFromSerializedPhrase initializes a phrase from a serialized phrase.

```
HRESULT InitFromSerializedPhrase(
   const   SPSERIALIZEDPHRASE   *pPhrase
);
```

Parameters

pPhrase
Address of the SPSERIALIZEDPHRASE structure that contains the phrase information.

Return values

Value	**Description**
S_OK	Function completed successfully.
E_INVALIDARG	*pSrcPhrase* or *pSrcPhrase->cbSerializedSize* is invalid or bad.
FAILED(hr)	Appropriate error message.

Example

The following code fragment demonstrates InitFromSerializedPhrase.

```
HRESULT hr;
CComPtr<ISpRecoResult>         RecoResult;
CComPtr<ISpPhraseBuilder>      pPhraseBuilder;
SPSERIALIZEDPHRASE            *SerializedPhrase=NULL;
SPSERIALIZEDPHRASE            *pSerPhrase=NULL;
ULONG                          SerSize;
CComPtr<IStream>               cpStream;

LARGE_INTEGER   liZero = {0,0};

hr = Init( &cpRecoResult );
// Check result

// Get SerializedPhrase
hr = cpRecoResult->GetSerializedPhrase(&pSerializedPhrase);

if(SUCCEEDED(hr))
    // Check for pSerializedPhrase != NULL

CreateStreamOnHGlobal(NULL, true, &cpStream);

if (cpStream)
        hr = cpStream->Write(pSerializedPhrase, pSerializedPhrase->ulSerializedSiz

hr = cpStream->Seek(liZero, STREAM_SEEK_SET, NULL);
if (SUCCEEDED(hr))
        hr = cpStream->Read((void *)&SerSize, sizeof(SerSize), NULL);

pSerPhrase = (SPSERIALIZEDPHRASE*)::CoTaskMemAlloc(SerSize);

        hr = cpStream->Seek(liZero, STREAM_SEEK_SET, NULL);
        if (SUCCEEDED(hr))
                hr = cpStream->Read((void *)pSerPhrase, SerSize, NULL);

        hr = cpPhraseBuilder.CoCreateInstance( CLSID_SpPhraseBuilder );
        // Check result

        hr = cpPhraseBuilder->InitFromSerializedPhrase( pSerPhrase );
        // Check result

::CoTaskMemFree( pSerializedPhrase );
```

[This is preliminary documentation and subject to change.]

ISpPhraseBuilder::AddElements

ISpPhraseBuilder::AddElements adds a copy of the given element to the end of this object's element list.

```
HRESULT AddElements(
   ULONG                     cElements,
   const SPPHRASEELEMENT    *pElement
);
```

Parameters

cElements
: Specifies the number of phrase elements to add.

pElement
: Address of the SPPHRASEELEMENT data structure containing the phrase element to add.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.
SPERR_UNINITIALIZED	The object has not been properly initialized.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpPhraseBuilder::AddRules

ISpPhraseBuilder::AddRules adds phrase rules to the phrase object.

```
HRESULT AddRules(
  const SPPHRASERULEHANDLE   hParent,
  const SPPHRASERULE        *pRule,
  SPPHRASERULEHANDLE        *phNewRule
);
```

Parameters

hParent
: Handle to the parent phrase rule.

pRule
: Address of the SPPHRASERULE structure that contains the phrase rule information.

phNewRule
: Address of the SPPHRASERULEHANDLE structure that contains the new phrase rule information.

Return values

Value	**Description**
S_OK	Function completed successfully.
E_POINTER	Invalid pointer.
SPERR_UNINITIALIZED	The object has not been properly initialized.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpPhraseBuilder::AddProperties

ISpPhraseBuilder::AddProperties adds property entries to the phrase object.

```
HRESULT AddProperties(
   const SPPHRASEPROPERTYHANDLE hParent,
   const SPPHRASEPROPERTY       *pProperty,
   SPPHRASEPROPERTYHANDLE       *phNewProperty
);
```

Parameters

hParent
Handle to the parent phrase element.

pProperty
Address of the SPPHRASEPROPERTY structure that contains the property information.

phNewProperty
Address of the SPPHRASEPROPERTYHANDLE structure that contains the new property information.

Return values

Value	**Description**
S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.
E_POINTER	Invalid pointer.
SPERR_UNINITIALIZED	The object has not been properly initialized.
SPERR_ALREADY_INITIALIZED	The object has already been initialized.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpPhraseBuilder::AddReplacements

ISpPhraseBuilder::AddReplacements adds one or more text replacements to the phrase.

```
HRESULT AddReplacements(
   ULONG                        cReplacements,
   const SPPHRASEREPLACEMENT   *pReplacements
);
```

Parameters

cReplacements
The number of replacement phrase elements.

pReplacements
Address of the SPPHRASEREPLACEMENT structure that contains the phrase element replacement information.

Return values

Value	**Description**
S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.
SPERR_UNINITIALIZED	The object has not been properly initialized.
FAILED(hr)	Appropriate error message.

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

Speech Recognition Engine Manager (DDI-level)

The following section covers:

- ISpPrivateEngineCall
- ISpSREngine
- ISpSREngineSite
- ISpSRAlternates

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpPrivateEngineCall

When to Implement

Implemented by SAPI and inherits from ISpRecoContext. Private Engine Call is initialized by the engine extension object while it is being created.

Methods in Vtable Order

ISpPrivateEngineCall Methods	Description
CallEngine	Allows an engine-specific call.

[This is preliminary documentation and subject to change.]

ISpPrivateEngineCall::CallEngine

ISpPrivateEngineCall::CallEngine allows an engine specific call.

It is called from the engine extension object to the engine object.

```
HRESULT CallEngine(
   PVOID   pCallFrame,
   ULONG   ulCallFrameSize
);
```

Parameters

pCallFrame
: [in, out] The engine-specific structured block of memory parameters. This block will be marshalled in the shared engine case and must not contain pointers to other memory allocations. It must be fully self–contained and relative only to itself.

ulCallFrameSize
: [in] Size, in bytes, of the *pCallFrame* structure.

Return values

Value	Description
S_OK	Function completed successfully.
E_FAILED	No engine could be found.
FAILED (hr)	Appropriate error message.

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpSREngine

The speech recognition engine implements the interface ISpSREngine.

Note: The ISpSREngine interface inherits from ISpCFGEngineClient.

Methods in Vtable Order

ISpSREngine Methods	Description
SetSite	Sets the ISpEngineSite interface for the engine to use.
GetInputAudioFormat	Gets the format of the input audio stream.
RecognizeStream	Begins recognition processing on a stream.
SetRecoProfile	Sets the profile information of the recognition profile token.
OnCreateGrammar	Creates a text buffer structure and returns a pointer to it.
OnDeleteGrammar	Removes the text buffer structure.
LoadProprietaryGrammar	Loads an engine specific grammar.
UnloadProprietaryGrammar	Unloads the engine specific grammar.
SetProprietaryRuleState	Sets the proprietary grammar rule state.
SetProprietaryRuleIdState	Sets the proprietary grammar rule ID state.
LoadSLM	Loads an engine specific statistical language model (SLM).
UnloadSLM	Unloads an engine specific statistical language model (SLM).
SetSLMState	Sets the initial state of the SR engine's SLM.
SetWordSequenceData	Sets the SR engine word sequence data.
SetTextSelection	Copies the currently selected text into the grammar.
IsPronounceable	Gets the IPA pronunciation of a word's pronunciation id.
OnCreateRecoContext	Sets the driver context cookie to NULL.
OnDeleteRecoContext	Notifies the engine that a recognition context is being destroyed.
PrivateCall	Gets or sets miscellaneous information about the engine.
SetAdaptationData	Sets the SR engine text data associated with the language model adaptation.
SetPropertyNum	Sets the numerical property attribute information of the SR engine.
GetPropertyNum	Retrieves the numerical property attribute information of the SR engine.
SetPropertyString	Sets the text property attribute information of the SR engine.
GetPropertyString	Retrieves the text property attribute information of the SR engine.
SetGrammarState	Changes the state of a proprietary to determine if specific grammar rules should be recognized.

[This is preliminary documentation and subject to change.]

ISpSREngine::SetSite

ISpSREngine::SetSite sets the ISpEngineSite interface for the engine to use. It also passes the SAPI 5 CFG language model if it is available.

```
HRESULT SetSite(
   ISpSREngineSite    *pSite
);
```

Parameters

pSite
Pointer to the ISpEngineSite interface of the engine to use.

Return values

Value	Description
S_OK	Function completed successfully.
E_OUTOFMEMORY	Exceeded available memory.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpSREngine::GetInputAudioFormat

ISpSREngine::GetInputAudioFormat gets the format of the input audio stream.

```
HRESULT GetInputAudioFormat(
   const GUID            *pSourceFormatId,
   const WAVEFORMATEX    *pSourceWFEX,
   GUID                  *pDesiredFormatId,
   WAVEFORMATEX         **ppCoMemDesiredWFEX,
   ULONG                 *pulBasicBlockSize
);
```

Parameters

pSourceFormatId
The GUID of the source file format. Not currently used.
pSourceWFEX
[in] Address of the WAVEFORMATEX structure containing the wave file format information.
pDesiredFormatId

The GUID of the intended format.

ppCoMemDesiredWFEX
  The complete wave file format information.

pulBasicBlockSize
  The basic block size of the wave based on the sampling rate. If the driver does not use a fixed block size, zero is passed back.

Return values

Value	**Description**
S_OK	Function completed successfully.
SPERR_FORMAT_NOT_SUPPORTED	A local id was not found or is not supported.
E_OUTOFMEMORY	Insufficient memory to allocate acoustic model.
E_FAIL	Speech user is invalid or not initialized.
E_UNEXPECTED	Sampling rate is not valid.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpSREngine::RecognizeStream

ISpSREngine::RecognizeStream begins recognition processing on a stream. The processing continues until the buffer is empty or is explicitly stopped. This method is implemented by the application.

```
HRESULT Function(
   REFGUID               rguidFmtId,
   const WAVEFORMATEX   *pWaveFormatEx,
   HANDLE                hRequestSync,
   HANDLE                hDataAvailable,
   HANDLE                hExit,
   BOOL                  fNewAudioStream,
   BOOL                  fRealTimeAudio,
   ISpObjectToken    s   *pAudioObjectToken
);
```

Parameters

rguidFmtId
  [in] The REFGUID for the format to recognize

pWaveFormatEx
  [in] Address of a WAVEFORMATEX structure describing the input format.

hRequestSync
  [in] Handle to the task queue allowing or denying stream synchronization.

hDataAvailable
  [in] Handle to the event indicating available data.

hExit
  [in] Handle to exit event.

fNewAudioStream

[in] Indicates whether the input is a new stream or not. TRUE means it is a newly created stream; FALSE otherwise.

fRealTimeAudio
    [in] Indicates whether the input is real time audio or not. TRUE means it is real time audio; FALSE otherwise

pAudioObjectToken
    [in] The object token interface for the stream.

Return values

Value	**Description**
S_OK	Function completed successfully.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpSREngine::SetRecoProfile

ISpSREngine::SetRecoProfile sets the profile information of the recognition profile token.

```
HRESULT SetRecoProfile(
   ISpObjectToken   *pProfile
);
```

Parameters

pProfile
    Address of an ISpObjectToken object that contains the recognition profile token information.

Return values

Value	**Description**
S_OK	Function completed successfully.
E_OUTOFMEMORY	Exceeded available memory.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpSREngine::OnCreateGrammar

ISpSREngine::OnCreateGrammar creates a text buffer structure and passes back a pointer to it as the *ppvEngineGrammar* cookie which the speech recognition (SR) engine will receive as part of the SPTEXTBUF transition.

```
HRESULT OnCreateGrammar(
   void              *pvEngineRecoContext,
   SPGRAMMARHANDLE    hSAPIGrammar,
   void             **ppvEngineGrammar
);
```

Parameters

pvEngineRecoContext
[in] The engine's recognition context.
hSAPIGrammar
[in] Handle to the SAPI grammar.
ppvEngineGrammar
[out] Address of a pointer to a *ppvEngineGrammar* that contains the grammar cookie.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.
E_OUTOFMEMORY	Exceeded available memory.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpSREngine::OnDeleteGrammar

ISpSREngine::OnDeleteGrammar removes the text buffer structure.

```
HRESULT OnDeleteGrammar(
   void   *pvEngineGrammar
);
```

Parameters

pvEngineGrammar
[in] Address of the text buffer structure that is being removed.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpSREngine::LoadProprietaryGrammar

ISpSREngine::LoadProprietaryGrammar loads an engine with either specific or proprietary grammar.

```
HRESULT LoadProprietaryGrammar(
   void           *pvEngineGrammar,
   REFGUID         rguidParam,
   const WCHAR    *pszStringParam,
   const void     *pvDataParam,
   ULONG           ulDataSize.
   SPLOADOPTIONS   Options
);
```

Parameters

pvEngineGrammar
    [in] The address of the driver's grammar cookie.
rguidParam
    [in] Unique identifier of the grammar.
pszStringParam
    [in, string] Address of a null-terminated string containing proprietary grammar string parameters.
pvDataParam
    [in] Pointer to the grammar image.
ulDataSize
    [in] Size, in bytes, of the grammar image.
Options
    [in] One of the grammar loading options specified in the SPLOADOPTIONS enumeration sequence.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*pvDataParam* or *ppvEngineGrammar* is invalid or bad.
E_OUTOFMEMORY (hr)	Insufficient memory available for allocations.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpSREngine::UnloadProprietaryGrammar

ISpSREngine::UnloadProprietaryGrammar unloads the engine specific grammar.

```
HRESULT UnloadProprietaryGrammar(
   void   *pvEngineGrammar
);
```

Parameters

pvEngineGrammar
[in] Address of the driver's grammar cookie.

Return values

Value	Description
S_OK	Function completed successfully.

[This is preliminary documentation and subject to change.]

ISpSREngine::SetProprietaryRuleState

ISpSREngine::SetProprietaryRuleState sets the proprietary grammar rule state.

```
HRESULT SetProprietaryRuleState(
   void            *pvEngineGrammar,
   const WCHAR     *pszName,
   const WCHAR     *pszValue,
   SPRULESTATE      NewState,
   ULONG           *pcRulesChanged
);
```

Parameters

pvEngineGrammar
[in] The engine's proprietary grammar rule.
pszName
[in, string] Address of a null-terminated string that contains the grammar rule name information.
pszValue
[in, string] Address of a null-terminated string that contains the grammar rule value information.
NewState
[in] One of the grammar rule states specified in the SPRULESTATE enumeration sequence.
pcRulesChanged
[out] The number of grammar rules being set.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*pvEngineGrammar* is invalid or bad.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpSREngine::SetProprietaryRuleIdState

ISpSREngine::SetProprietaryRuleIdState sets the propriety grammar rule ID state.

```
HRESULT SetProprietaryRuleIdState(
   void          *pvEngineGrammar,
   DWORD          dwRuleId,
   SPRULESTATE    NewState
);
```

Parameters

pvEngineGrammar
  [in] The engine's proprietary grammar rule.
dwRuleId
  [in] The engine propriety grammar rule identifier.
NewState
  [in] One of the grammar rule states specified in the SPRULESTATE enumeration sequence.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpSREngine::LoadSLM

ISpSREngine::LoadSLM loads an engine specific statistical language model (SLM).

```
HRESULT LoadSLM(
   void           *pvEngineGrammar,
   const WCHAR    *pszTopicName
);
```

Parameters

pvEngineGrammar
  [in] The current grammar for the engine.
pszTopicName
  [in, string] Address of a null-terminated string that specifies the SLM name information. The default SLM is loaded if the value of *pszTopicName* is NULL.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*pvEngineGrammar* is invalid or bad.
E_OUTOFMEMORY	Exceeded available memory.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpSREngine::UnloadSLM

ISpSREngine::UnloadSLM unloads an engine specific statistical language model (SLM).

```
HRESULT UnloadSLM(
   void   *pvEngineGrammar
);
```

Parameters

pvEngineGrammar
  [in] The current grammar for the engine.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*pvEngineGrammar* is invalid or bad.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpSREngine::SetSLMState

ISpSREngine::SetSLMState sets the initial state of the SR engine's statistical language model (SLM).

```
HRESULT SetSLMState(
   void          *pvEngineGrammar,
   SPRULESTATE    NewState
);
```

Parameters

pvEngineGrammar
  [in] The current grammar for the engine.
NewState
  [in] One of the grammar rule states specified in the SPRULESTATE enumeration sequence.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpSREngine::SetWordSequenceData

ISpSREngine::SetWordSequenceData sets the SR engine word sequence data.

```
HRESULT SetWordSequenceData(
   void                        *pvEngineGrammar,
   const WCHAR                 *pText,
   ULONG                        cchText,
   const  SPTEXTSELECTIONINFO  *pInfo
);
```

Parameters

pvEngineGrammar
  [in] The current grammar for the engine.
pText
  [in] The text selection information.
cchText
  [in] The length, in characters, of the text buffer.
pInfo
  [in] Address of the SPTEXTSELECTIONINFO structure that contains the sequence information.

Return values

Value	Description
S_OK	Function completed successfully.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpSREngine::SetTextSelection

ISpSREngine::SetTextSelection copies the currently selected text into the grammar.

```
HRESULT SetTextSelection(
   void                          *pvEngineGrammar,
   const  SPTEXTSELECTIONINFO    *pInfo
);
```

Parameters

pvEngineGrammar
[in] The current grammar for the engine.
pInfo
[in] The text selection information.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*pvEngineGrammar* is invalid or bad.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpSREngine::IsPronounceable

ISpSREngine::IsPronounceable gets the International Phonetic Alphabet (IPA) pronunciation of a word's pronunciation id.

```
HRESULT IsPronounceable(
   void          *pvDrvGrammar,
   const WCHAR   *pszWord,
   BOOL          *pfPronounceable
);
```

Parameters

pvDrvGrammar
  [in] The driver's grammar cookie.
pszWord
  [in] The word to test.
pfPronounceable
  [out] Flag indicating the results of the test. TRUE, if a pronunciation was found; FALSE, otherwise.

Return values

Value	Description
S_OK	Method completed successfully.
E_NOTIMPL	The SLM interface is not available.
FAILED(hr)	Appropriate error message.

See Also

ISpRecoGrammar::IsPronounceable

[This is preliminary documentation and subject to change.]

ISpSREngine::OnCreateRecoContext

ISpSREngine::OnCreateRecoContext notifies the engine that a recognition context is being created.

```
HRESULT OnCreateRecoContext(
   void    *pvSapiContext,
   void   **ppvEngineContext
);
```

Parameters

pvSapiContext
  [in] Handle to the recognition context.
ppvEngineContext
  [out] Pointer to engine-specific information.

Return values

Value	Description
NOERROR	Call succeeds.

[This is preliminary documentation and subject to change.]

ISpSREngine::OnDeleteRecoContext

ISpSREngine::OnDeleteRecoContext notifies the engine that a recognition context is being destroyed.

Note: This method performs no operation and returns S_OK.

```
HRESULT OnDeleteRecoContext(
   void   *pvEngineContext
);
```

Parameters

pvEngineContext
[in] Pointer to the engine context value returned from a previous call to ISpSREngine::OnCreateRecoContext for this context.

Return values

Value	Description
S_OK	Only possible return value.

[This is preliminary documentation and subject to change.]

ISpSREngine::PrivateCall

ISpSREngine::PrivateCall gets or sets miscellaneous information about the engine.

```
HRESULT PrivateCall(
   VOID   *pvEngineCtxtCookie,
   void   *pCallFrame,
   ULONG   ulCallFrameSize,
);
```

Parameters

pvEngineCtxtCookie
[in] The driver's recognition context cookie.
pCallFrame
[in] Pointer to the private data.
ulCallFrameSize
[in] Size, in bytes, of the private data.

Return values

Value	**Description**
S_OK	Function completed successfully.
E_INVALIDARG	*pCallFrame* is not a recognized value.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpSREngine::SetAdaptationData

ISpSREngine::SetAdaptationData sets the SR engine text data associated with the language model adaptation.

```
HRESULT SetAdaptationData(
   void          *pvEngineContext,
   const WCHAR   *pCoMemAdaptationData,
   const ULONG    cch
);
```

Parameters

pvEngineContext
    [in] Address of the SR engine context information.
pCoMemAdaptationData
    Address of the adaption data information. Applications implementing this method must call CoTaskMemFree() to free memory associated with this string.
cch
    The number of SR engine text data items.

Return values

Value	**Description**
S_OK	Function completed successfully.
E_OUTOFMEMORY	Exceeded available memory.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpSREngine::SetPropertyNum

ISpSREngine::SetPropertyNum sets the numerical property attribute information of the SR engine.

```
HRESULT SetPropertyNum(
   SPPROPSRC         eSrc,
   void             *pvSrcObj,
   const WCHAR      *pName,
   LONG              lValue
);
```

Parameters

eSrc
[in] One of the recognition context types specified in the SPPROPSRC enumeration sequence.
pvSrcObj
[in] Address of the object containing the property name and value information.
pName
[in] Address of the string containing the property attribute name information.
lValue
[in] Address of the value containing the property attribute value information.

Return values

Value	**Description**
S_OK	Function completed successfully.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpSREngine::GetPropertyNum

ISpSREngine::GetPropertyNum retrieves the numerical property attribute information of the SR engine.

```
HRESULT GetPropertyNum(
   SPPROPSRC        eSrc,
   void            *pvSrcObj,
   const WCHAR     *pName,
   LONG            *lValue
);
```

Parameters

eSrc
[in] One of the recognition context types specified in the SPPROPSRC enumeration sequence.
pvSrcObj
[in] Address of the object containing the property name and value information.
pName
[in] Address of the string containing the property attribute name information.
lValue
[out] Address of the value containing the property attribute value information.

Return values

Value	Description
S_OK	Function completed successfully.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpSREngine::SetPropertyString

ISpSREngine::SetPropertyString sets the text property attribute information of the SR engine.

```
HRESULT SetPropertyString(
   SPPROPSRC      eSrc,
   void          *pvSrcObj,
   const WCHAR   *pName,
   const WCHAR   *pValue
);
```

Parameters

eSrc
    [in] One of the recognition context types specified in the SPPROPSRC enumeration sequence.
pvSrcObj
    [in] Address of the object containing the property name and value information.
pName
    [in] Address of the string containing the property attribute name information.
pValue
    [in] Address of the value containing the property attribute value information.

Return values

Value	Description
S_OK	Function completed successfully.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpSREngine::GetPropertyString

ISpSREngine::GetPropertyString retrieves the text property attribute information of the SR engine.

```
HRESULT GetPropertyString(
   SPPROPSRC          eSrc,
   void              *pvSrcObj,
   const   WCHAR     *pName,
   WCHAR            **ppCoMemValue
);
```

Parameters

eSrc
[in] One of the recognition context types specified in the SPPROPSRC enumeration sequence.
pvSrcObj
[in] Address of the object containing the property name and value information.
pName
[in] Address of the string containing the property attribute name information.
ppCoMemValue
[out] Address of a pointer to a string that receives the property attribute value information. Applications implementing this method must call CoTaskMemFree() to free memory associated with this string.

Return values

Value	Description
S_OK	Function completed successfully.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpSREngine::SetGrammarState

ISpSREngine::SetGrammarState changes the state of a proprietary to determine if specific grammar rules should be recognized. The SR engine must implement this method itself. If the engine does not support proprietary grammars, then S_OK may be returned.

```
HRESULT SetGrammarState(
   void              *pvEngineGrammar,
   SPGRAMMARSTATE    *eGrammarState
);
```

Parameters

pvEngineGrammar
[in] Void pointer to the specified grammar for the context.
eGrammarState
[in] Flag of type SPGRAMMARSTATE indicating the new state of the grammar.

Return values

Return values are specific to the engine implementation.

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpSREngineSite

The interface ISpEngineSite is implemented by SAPI and is called by the engine to get audio data and signal detected sound events, and return recognition information.

Methods in Vtable Order

ISpSREngineSite Methods	Description
Read	Reads the input stream in a safe thread method.
DataAvailable	Retrieves the amount of data that can be read.
SetBufferNotifySize	(This method is not yet implemented)
ParseFromTransitions	Parses an ISpPhraseBuilder result from a list of transitions.
Recognition	Indicates an end of the phrase and to start recognition.
AddEvent	Retrieves a RecoContext event handle from the SR engine.
Synchronize	Allows the SR engine to process changes in its active grammar state.
GetWordInfo	Retrieves information for CFG word.
SetWordClientContext	Sets an engine-defined context pointer for a CFG word.
GetRuleInfo	Retrieves information about a CFG rule.
SetRuleClientContext	Sets an engine-defined context pointer for a CFG rule.
GetStateInfo	Retrieves transition state information for CFG transition.
GetResource	Retrieves a named resource from a grammar.
GetTransitionProperty	Retrieves the SR engine transition property information.
IsAlternate	Determines whether one rule is an alternate of the other.
GetMaxAlternates	Passes back the maximum number of alternates that should be generated for the specified rule.
GetContextMaxAlternates	Passes back the maximum number of alternates that should be generated for the specified recognition context.
UpdateRecoPos	Returns the current position of the recognizer in the stream.

[This is preliminary documentation and subject to change.]

ISpSREngineSite::Read

ISpSREngineSite::Read reads the input stream in a safe thread method.

```
HRESULT Function(
   void     *pv,
   ULONG     cb,
   ULONG    *pcbRead
);
```

Parameters

pv
: [in] The input stream.

cb
: [in] Size, in bytes, of the input stream.

pcbRead
: [out] Number of bytes read.

Return values

Value	Description
S_OK	Function completed successfully.
SPERR_STREAM_NOT_ACTIVE	Input stream is not defined or active.
E_POINTER	At least one of *pcbRead* or *pv* are invalid or bad.
STG_E_ACCESSDENIED	Input stream is read only and no bytes will be read.
FAILED (hr)	Appropriate error message.

ISpSREngineSite::DataAvailable

ISpSREngineSite::DataAvailable retrieves the amount of data that can be read using ISpSREngineSite::Read without blocking.

```
HRESULT DataAvailable(
   ULONG   pcb
);
```

Parameters

pcb
: [out] The amount, in bytes, of data available. For audio streams this is the actual amount. For non-audio streams, this is the minimum known amount.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*ullStartPos* is less than the stream minimum.
E_POINTER	*pullDataAvailable* or *pfNoBlock* is invalid or bad.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpSREngineSite::SetBufferNotifySize

Note: This method is not implemented.

```
HRESULT SetBufferNotifySize(
   ULONG   cbSize
);
```

Parameters

cbSize
[in] The minimum amount of data that should be available before the event is set.

Return values

Value	Description
S_OK	Function completed successfully.

[This is preliminary documentation and subject to change.]

ISpSREngineSite::ParseFromTransitions

ISpSREngineSite::ParseFromTransitions parses an ISpPhraseBuilder result from a list of transitions.

Called by the SR engine to get an SPPHRASE. This method uses a greedy top-down search algorithm to find the semantic properties.

```
HRESULT ParseFromTransitions(
   const   SPPARSEINFO   *pParseInfo,
   ISpPhraseBuilder      **ppPhrase
);
```

Parameters

pParseInfo
    [in] Address of the SPPARSEINFO structure containing phrase information.
ppPhrase
    [out] Address of a pointer to an ISpPhraseBuilder interface that receives the phrase information.

Return values

Value	**Description**
S_OK	Function completed successfully.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpSREngineSite::Recognition

ISpSREngineSite::Recognition indicates the end of a phrase and initiates recognition.

The phrase can be either a hypothesis or a final result. If it is a hypothesis, a global hypothesis notification is issued to all interested recognition contexts. Otherwise, a final global hypothesis notification is issued to all interested contexts. A final phrase notification is issued to the target grammar identified by the SR engine.

ISpSREngineSite::AddEvent with a SPEI_PHRASE_START as the event type must precede the call to ::Recognition. SAPI does enforce the phrase start and recognition order. *pResultInfo* must be allocated by CoTaskMemAlloc() so that ownership can pass to SAPI.

```
HRESULT Recognition(
   SPRECORESULTINFO   *pResultInfo
);
```

Parameters

pResultInfo
    [in] Pointer to type SPRECORESULTINFO indicating the results.

Return values

Value	**Description**
S_OK	Function completed successfully and to continue recognition.
S_FALSE	Function completed successfully and the engine can terminate recognition without reading the rest of the stream.

FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpSREngineSite::AddEvent

ISpSREngineSite::AddEvent retrieves a RecoContext event handle from the SR engine.

```
HRESULT AddEvent(
   const  SPEVENT        *pEvent,
   SPRECOCONTEXTHANDLE    hContext
);
```

Parameters

pEvent
[in] Address of the SPEVENT structure containing the event information.
hContext
[in] The RecoContext is the event handle passed to SR Engine from SAPI through ISpSREngine::OnCreateRecoContext. A NULL value in *hContext* indicates the event is a global one.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	At least one of *pEvent* or *hContext* is invalid or bad. Alternatively, it indicates an event is being added to an inappropriate mode.
E_POINTER	Invalid pointer.
SPERR_STREAM_POS_INVALID	The current audio stream offset is greater than either the current seek position or the last sync position. Alternatively, if the event stream is not initialized the stream position is not zero.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpSREngineSite::Synchronize

ISpSREngineSite::Synchronize allows the SR engine to process changes in its active grammar state.

```
HRESULT Synchronize(
   ULONGLONG   ullStreamPos
);
```

Parameters

ullStreamPos
[in] The position within the audio stream to stop processing.

Return values

Value	**Description**
S_OK	Function completed successfully and to continue recognition.
SPERR_STREAM_NOT_ACTIVE	Stream is not initialized.
SPERR_STREAM_POS_INVALID	Stream position is either greater than the current seek position or less than the last synchronized position.
S_FALSE	Function completed successfully and the engine can terminate recognition without reading the rest of the stream.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpSREngineSite::GetWordInfo

ISpSREngineSite::GetWordInfo retrieves information for CFG word.

```
HRESULT GetWordInfo(
   SPWORDENTRY     *pWordEntry,
   SPWORDINFOOPT    Options
);
```

Parameters

pWordEntry
Address of the SPWORDENTRY structure that contains the grammar word entry information. The following members may be allocated with CoTaskMemAlloc() and if so, must be freed with CoTaskMemtaskFree() when no longer required.
pWordEntry->pszDisplayText
pWordEntry->pszLexicalForm
pWordEntry->aPhoneId

Options
One of the grammar word options specified in the SPWORDINFOOPT enumeration.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*Options* cannot include both SPWIO_NONE and SPWIO_WANT_TEXT
E_OUTOFMEMORY	Not enough memory to complete the operation.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpSREngineSite::SetWordClientContext

ISpSREngineSite::SetWordClientContext sets an engine-defined context pointer for a CFG word.

```
HRESULT SetWordClientContext(
   SPWORDHANDLE   hWord,
   void          *pvClientContext
);
```

Parameters

hWord
The handle for a word.
pvClientContext
Pointer to the word's client context.

Return values

Value	Description
S_OK	Function completed successfully.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpSREngineSite::GetRuleInfo

ISpSREngineSite::GetRuleInfo retrieves information about a CFG rule.

```
HRESULT GetRuleInfo(
   SPRULEENTRY     *pRuleEntry,
   SPRULEINFOOPT    Options
);
```

Parameters

pRuleEntry
[in, out] Address of the SPRULEENTRY structure that contains the grammar rule entry information.

Options
[in] One of the grammar rule options specified in the SPRULEINFOOPT enumeration sequence.

Return values

Value	Description
S_OK	Function completed successfully.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpSREngineSite::SetRuleClientContext

ISpSREngineSite::SetRuleClientContext sets an engine-defined context pointer for a CFG rule.

```
HRESULT SetRuleClientContext(
   SPRULEHANDLE   hRule,
   void          *pvClientContext
);
```

Parameters

hRule
Handle of rule that was recognized.

pvClientContext
Pointer to the rule's client context.

Return values

Value	Description
S_OK	Function completed successfully.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpSREngineSite::GetStateInfo

ISpSREngineSite::GetStateInfo retrieves transition state information for CFG transition.

```
HRESULT GetStateInfo(
   SPSTATEHANDLE   hState,
   SPSTATEINFO     *pStateInfo
);
```

Parameters

hState
  Handle to the current state.
pStateInfo
  The state information.

Return values

Value	Description
S_OK	Function completed successfully.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpSREngineSite::GetResource

ISpSREngineSite::GetResource retrieves a named resource from a grammar.

Note: This method is not currently implemented.

```
HRESULT GetResource(
   SPRULEHANDLE   hRule,
   WCHAR         **ppCoMemResource
);
```

Parameters

hRule
  [in] The rule handle.
ppCoMemResource
  The resource associated with the rule. Applications implementing this method must call CoTaskMemFree() to free memory associated with this resource.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	*ppCoMemResource* is invalid or bad.
E_NOTIMPL	Method is not implemented.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpSREngineSite::GetTransitionProperty

ISpSREngineSite::GetTransitionProperty retrieves the SR engine transition property information.

```
HRESULT GetTransitionProperty(
   SPTRANSITIONID          ID,
   SPTRANSITIONPROPERTY    **ppCoMemProperty
);
```

Parameters

ID
[in] The transition identifier.
ppCoMemProperty
[out] Address of a pointer to a SPTRANSITIONPROPERTY that receives the transition information. Applications implementing this method must call CoTaskMemFree() to free memory associated with this resource.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	One or more arguments are invalid.
E_POINTER	Invalid pointer.
E_OUTOFMEMORY	Exceeded available memory.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpSREngineSite::IsAlternate

ISpSREngineSite::IsAlternate determines whether one rule is an alternate of the other.

```
HRESULT IsAlternate(
   SPRULEHANDLE   hPriRule,
   SPRULEHANDLE   hAltRule
);
```

Parameters

hPriRule
  [in] The primary rule.
hAltRule
  [in] The alternate rule to be checked.

Return values

Value	Description
S_OK	*hAltRule* is an alternate of *hPriRule*.
S_FALSE	*hAltRule* is not an alternate of *hPriRule*.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpSREngineSite::GetMaxAlternates

ISpSREngineSite::GetMaxAlternates passes back the maximum number of alternates that should be generated for the specified rule.

```
HRESULT GetMaxAlternates(
   SPRULEHANDLE   hRule,
   ULONG         *pulNumAlts
);
```

Parameters

hRule
  [in] The rule to check.
pulNumAlts
  [out] The maximum number of alternates for the rule.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	*pulNumAlts* is invalid or bad.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpSREngineSite::GetContextMaxAlternates

ISpSREngineSite::GetContextMaxAlternates passes back the maximum number of alternates that should be generated for the specified recognition context. Engines supporting proprietary grammars need to call this to determine how many alternates to generate. For SAPI grammars, it is usually easier to use the ISpSREngineSite::GetMaxAlternates method.

```
HRESULT GetContextMaxAlternates(
   SPRECOCONTEXTHANDLE   hContext,
   ULONG                *pulNumAlts
);
```

Parameters

hContext
[in] Handle to the current context.
pulNumAlts
[out] The number of possible alternates.

Return values

Value	Description
S_OK	Function completed successfully.
E_POINTER	*pulNumAlts* is invalid or bad.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpSREngineSite::UpdateRecoPos

ISpSREngineSite::UpdateRecoPos returns the current position of the recognizer in the stream to SAPI. An engine should call this regularly, up to several times a second, regardless of whether it is recognizing speech or silence.

```
HRESULT UpdateRecoPos(
   ULONGLONG   ullStreamPos
);
```

Parameters

ullStreamPos
    [out] The current recognizer of the stream position.

Return values

Value	Description
S_OK	Function completed successfully and to continue recognition.

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpSRAlternates

ISpSRAlternates allows alternate word selection and implementation for speech recognition.

Methods in Vtable Order

ISpSRAlternates Methods	Description
GetAlternates	Retrieves a list of alternate words.
Commit	Chooses the lexicon manager's word probability.

[This is preliminary documentation and subject to change.]

ISpSRAlternates::GetAlternates

ISpSRAlternates::GetAlternates retrieves a list of alternate words.

```
HRESULT GetAlternates(
   SPPHRASEALTREQUEST   *pAltRequest,
   SPPHRASEALT         **ppAlts,
   ULONG                *pcAlts
);
```

Parameters

pAltRequest
    [in] A structure to the requested alternate words.
ppAlts
    [out] A list of SPPHRASEALT for alternate words.
pcAlts
    [out] The number of alternates in *ppAlts*list.

0067516395 . 122600

Return values

Value	Description
S_OK	Function completed successfully.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpSRAlternates::Commit

ISpSRAlternates::Commit chooses the lexicon manager's word probability. This allows fine adjustments for the decoder to pick the new, alternate words over the current ones.

```
HRESULT Commit(
   SPPHRASEALTREQUEST  *pAltRequest,
   SPPHRASEALT         *pAlt,
   void               **ppvResultExtra,
   ULONG               *pcbResultExtra
);
```

Parameters

pAltRequest
: [in] A structure to the requested alternate words.

pAlt
: [in] A structure to alternate words.

ppvResultExtra
: [out] Additional information for the new results.

pcbResultExtra
: [out] Size, in bytes, of *ppvResultExtra*.

Return values

Value	Description
S_OK	Function completed successfully.
FAILED (hr)	Appropriate error message.

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

Text To Speech Recognition Engine Manager

(DDI-level)

The following section covers:

- ISpTTSEngine
- ISpTTSEngineSite

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpTTSEngine

The SAPI speech synthesis (text-to-speech, or TTS) engine (driver) implements an ISpTTSEngine interface.

ISpTTSEngine::Speak is the primary method called by SAPI to perform speech rendering. SAPI, rather than the engine, performs XML parsing of the input text stream. The engine's Speak method is handed a linked list of text fragments with their associated XML attribute state. The Speak method also receives a pointer to the SpVoice's ISpTTSEngineSite interface. The TTS engine uses this interface to queue events and to write the output data.

Even though SAPI 5.0 is a free–threaded architecture, TTS engine instances will always be called by SAPI on a single thread. TTS engines are never directly accessed by applications. SAPI ensures that all parameter validation and thread synchronization has been performed properly before calling the TTS engine. All calls to the TTS engine in the release build of SAPI are within a try or except block to protect applications from faulting.

Methods in Vtable Order

ISpTTSEngine Methods	Description
Speak	Speaks a text buffer.
GetOutputFormat	Retrieves the output stream format.

[This is preliminary documentation and subject to change.]

ISpTTSEngine::Speak

ISpTTSEngine::Speak speaks a text buffer according to the associated XML state.

The Speak method renders the specified linked list of text fragments in the selected output format. All XML markups have been removed from the input text; the absolute state has been accumulated and stored in a data structure associated with each text fragment.

```
HRESULT Speak(
   DWORD                  dwSpeakFlags,
   REFGUID                rguidFormatId,
   const WaveFormatEx     *pWaveFormatEx,
   const SPVTEXTFRAG      *pTextFragList,
   ISpTTSEngineSite       *pOutputSite
);
```

Parameters

dwSpeakFlags
[in] Flags defining the attributes of speech. These values are contained in the SPEAKFLAGS enumeration.

rguidFormatId
[in] The stream format identifier describing the desired output format.

SPDFID_Text	If SPDFID_Text is specified, the output is sent to a text buffer and *pTargetWaveFormatEx* is NULL.
SPDFID_WaveFormatEx	If SPDFID_WaveFormatEx is specified, the output type is a WAVEFORMATEX data structure.

pWaveFormatEx
[in] Address of a WAVEFORMATEX structure describing the output format.

Note: WaveFormatEx is the output format when the contents of *rguidFormatId* is SPDFID_WaveFormatEx.
The contents of *pWaveFormatEx* is NULL if *rguidFormatID* specifies SPDFID_Text.

pTextFragList
[in] The fragment link list of type SPVTEXTFRAG to synthesize.

pOutputSite
[in] Address of the ISpTTSEngineSite interface of the SpVoice object where events are queued and the output data is written.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*rguidFormatId* or *pOutputSite* is bad or invalid.
E_OUTOFMEMORY	Exceeded available memory.
FAILED (hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpTTSEngine::GetOutputFormat

ISpTTSEngine::GetOutputFormat retrieves the output stream format.

If the specified output format is not supported by the engine, the engine can return either the closest format supported or the default format of the engine.

```
HRESULT GetOutputFormat(
   const GUID           *pTargetFmtId,
   const WAVEFORMATEX   *pTargetWaveFormatEx,
   GUID                 *pOutputFormatId,
   WAVEFORMATEX        **ppCoMemOutputWaveFormatEx
);
```

Parameters

pTargetFmtId
[in] Address of the GUID describing the output format desired by the application.

SPDFID_Text	If SPDFID_Text is specified, the output is sent to a text buffer and *pTargetWaveFormatEx* is NULL.
SPDFID_WaveFormatEx	If SPDFID_WaveFormatEx is specified, the output type is a WAVEFORMATEX data structure.

pTargetWaveFormatEx
[in] Address of the WAVEFORMATEX structure describing the application's output format. If *pTagetFmtId* specifies SPDFID_Text, the contents of *pTargetWaveFormatEx* will be NULL.

The contents of *pTargetWaveFormatEx* must be set when *pTagetFmtId* is specified as SPDFID_WaveFormatEx.

pOutputFormatId
[out] Address of the output format identifier.

SPDFID_Text	If SPDFID_Text is specified, *ppCoMemOutputWaveFormatEx* is set to NULL.
SPDFID_WaveFormatEx	If SPDFID_WaveFormatEx is specified, and the engine can support this format, then a pointer to the WAVEFORMATEX structure should be returned by the engine.

ppCoMemOutputWaveFormatEx
[out] Adddress of the pointer to the WAVEFORMATEX returned by the engine.

Return values

Value	Description
S_OK	Function completed successfully.
E_OUTOFMEMORY	*ppCoMemDesiredWaveFormatEx* could not be allocated.
FAILED (hr)	Appropriate error message.

Microsoft Speech SDK
with SAPI 5.0

[This is preliminary documentation and subject to change.]

ISpTTSEngineSite

ISpTTSEngineSite is implemented on the voice and redirects engine output based on current voice settings.

Note: The ISpTTSEngineSite interface inherits from ISpEventSink.

Methods in Vtable Order

ISpTTSEngineSite Methods	Description
GetActions	Retrieves the action the engine needs to perform.
Write	Sends synthesized speech audio data to the TTS engine.
GetRate	Retrieves the current TTS engine rate.
GetVolume	Retrieves the output volume level of speech synthesized by an engine.
GetSkipInfo	Retrieves the number and type of items to be skipped in the text stream.
CompleteSkip	Retrieves the number of sentences skipped by the engine.

[This is preliminary documentation and subject to change.]

ISpTTSEngineSite::GetActions

ISpTTSEngineSite::GetActions obtains the action that it needs to perform. SAPI returns a DWORD indicating one of several actions contained in the SPVESACTIONS enumeration.

```
DWORD GetActions ( void );
```

Parameters

None.

Return values

The DWORD indicates whether or not the engine should take any actions.

[This is preliminary documentation and subject to change.]

ISpTTSEngineSite::Write

ISpTTSEngineSite::Write sends synthesized speech audio data to SAPI allowing it to send the audio data to the output destination.

SAPI handles sending the audio data to the correct output destination. It is important that any events associated with the audio data are queued by calling the ISpEventSink::AddEvents method prior to calling this method. This ensures proper synchronization of event firing and audio rendering.

```
HRESULT Write(
   const void   *pBuff,
   ULONG         cb,
   ULONG        *pcbWritten
);
```

Parameters

pBuff
: Pointer to synthesized speech audio data. The format (resolution) is specified by SAPI on the ISpTTSEngine::Speak call on which this ISpTTSEngineSite interface was passed.

cb
: The buffer size, in bytes, of *pBuff*.

pcbWritten
: Pointer to the number of bytes actually copied.

Return values

Value	Description
S_OK	Function completed successfully.
E_INVALIDARG	*pBuff* is bad or invalid.
E_POINTER	*pcbWritten* is bad or invalid.
SPERR_UNINITIALIZED	Output stream can not be initialized.
FAILED (hr)	Appropriate error message.

09754836.122900

[This is preliminary documentation and subject to change.]

ISpTTSEngineSite::GetRate

ISpTTSEngineSite::GetRate retrieves the current TTS engine rate.

```
HRESULT GetRate(
   long   *pRateAdjust
);
```

Parameters

pRateAdjust
: [out] Value specifying the units per minute rate for spoken text.

Return values

Value	Description
S_OK	Function completed successfully.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpTTSEngineSite::GetVolume

ISpTTSEngineSite::GetVolume retrieves the output volume level of speech synthesized by an engine.

```
HRESULT GetVolume(
  USHORT* pusVolume
);
```

Parameters

pusVolume
[out] Address of the value that receives the volume level information.

Return values

Value	Description
S_OK	Function completed successfully.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpTTSEngineSite::GetSkipInfo

ISpTTSEngineSite::GetSkipInfo retrieves the number and type of items to be skipped in the text stream. These items can be skipped either forward or backward within the text stream.

```
HRESULT GetSkipInfo(
   SPVSKIPTYPE    *peType,
   long           *plNumItems
);
```

Parameters

peType
[out] Address of the SPVSKIPTYPE enumeration that receives the item type information.
plNumItems
[out] Address of a value specifying the number of items to skip.

Return values

Value	Description
S_OK	Function completed successfully.
FAILED(hr)	Appropriate error message.

[This is preliminary documentation and subject to change.]

ISpTTSEngineSite::CompleteSkip

ISpTTSEngineSite::CompleteSkip retrieves the number of sentences skipped by the engine and passes the count to SAPI.

```
HRESULT CompleteSkip(
   long   ulNumSkipped
);
```

Parameters

ulNumSkipped

[in] Specifies the number of items to be skipped. Negative values result in a skip in the reverse direction, while positive values result in a skip forward. A value of zero causes the engine to skip to the beginning of the current item of the specified type.

For example, if the item type were "sentence" and the value of *ulNumSkipped* is zero, the engine will begin the sentence again. Additionally, the engine will skip to the beginning of the next sentence if the value of *ulNumSkipped* is one. Conversely, the engine will skip to the beginning of the previous sentence if the value of *ulNumSkipped* is negative one.

Return values

Value	Description
S_OK	Function completed successfully.
FAILED(hr)	Appropriate error message.